# CHAPTER 8

# DIRECT DIGITAL CONTROL IMPLEMENTATION

1. GENERAL. The programs described in Chapter 7 can be applied to existing or new systems. Most of these programs may be applied to several types of systems, but others may only be applicable to special types of systems. For example, the boiler monitoring and control program is only applicable to facilities with boiler plants. Due to the interactive nature of the programs, the inputs and/or outputs of one implemented program may provide inputs to other programs.

2. INSTRUMENTS AND INPUTS. Certain instruments and inputs can be common to an entire building or, in some case, the entire UMCS. Electrical consumption and demand instrumentation do not need to be duplicated except in special cases, such as when a UMCS serves an extremely large geographical area, or multiple utility substations. When applications require OA measurement, the minimum requirement is one OA temperature and one RH instrument (when used) for each building. However, the designer may need to increase the minimum requirements to satisfy site specific building and system conditions. For example, separate OA instruments will be specified where intake temperatures of the OA measured on a roof mounted unit may vary significantly from other air intake locations, causing erroneous economizer calculations.

3. DIAGRAMS. Graphic diagrams of typical systems showing UMCS devices and functions for direct control implementation are provided in Figures 8-1 through 8-16. Failure modes will be defined by the designer for each system's controlled devices in the event of a field equipment panel malfunction. Failure modes will be based on climate, type of system, and user requirements. The failure modes shown are for example purposes only.

4. TABLES. Database tables listing UMCS software and settings applied to typical systems are provided in Tables 8-1 through 8-16. The designer will generate a separate database table for each system to be controlled or monitored by the UMCS. Two or more identical systems within the same building, having the same occupancy schedule, may be listed on the same database table. The table's contents and setpoint values will be tailored to the system being controlled for each specific application.

5. SYMBOLS AND ABBREVIATIONS. A listing of symbols and abbreviations used in the system schematics is provided in Appendix B.

6. SEQUENCES OF OPERATION. The design will include a sequence of operations for each system under direct digital control of the UMCS. The sequence of operations will be tailored for the specific site, system and application. Sequences of operation will identify required control loop accuracy when different from default requirements identified in the guide specification CEGS-16935. Sequences of operation for typical HVAC systems are provided in the following paragraphs. These sequences are keyed to the corresponding figures and tables.

a. Steam/Hot Water Converter and Primary/Secondary Heating System Sequence of Operation (Figure 8-1 and Table 8-1).

(1) All Modes. The UMCS will start and stop the primary and secondary pumps in sequence based on the signal from an outside-air temperature sensor as shown. The UMCS will enable control of the steam/hot water converter control valve when the primary pump is operating. The UMCS will control the primary loop hot water supply temperature by modulating the steam control valve in response to a temperature sensor element and transmitter located in the hot water supply line to maintain its setpoint. The UMCS will reset the hot water supply temperature setpoint with respect to the outside air temperature in a linear schedule as shown.

(2) Occupied Mode. The UMCS will modulate the secondary heating control valve when the secondary zone pump is operating) to maintain the heating zone occupied space temperature setpoint.

(3) Unoccupied Mode. The UMCS will modulate the secondary heating control valve (when the secondary zone pump is operating) to maintaining the heating zone unoccupied space temperature.

b. Hot Water Boiler and Primary/Secondary Heating System Sequence of Operation Figure 8-2 and Table 8-2).

(1) All Modes. The UMCS will start and stop the primary and secondary pumps in sequence based on the signal from an outside-air temperature sensor as shown. The UMCS will enable local control of the hot water boiler when the primary pump is operating. The UMCS will control the primary loop hot water supply temperature by modulating the hot water boiler bypass valve in response to a temperature sensor located in the hot water supply line to maintain its setpoint. The UMCS will reset the hot water supply temperature setpoint with respect to outside air temperature in a linear schedule as shown. Reduced-flow control of the hot water bypass valve will be coordinated with the boiler manufacturer's recommendations and boiler safety settings. The UMCS will disable boiler operation when the primary pump is off.

(2) Occupied Mode. The UMCS will modulate the secondary heating control valve (when the secondary zone pump is operating) to maintain the heating zone occupied space temperature setpoint.

(3) Unoccupied Mode. The UMCS will modulate the secondary heating control valve (when the secondary zone pump is operating) to maintaining the heating zone unoccupied space temperature.

c. Hot Water Boiler with Constant Volume Circulating Loop and Primary/Secondary Heating System Sequence of Operation (Figure 8-3 and Table 8-3).

(1) All Modes. The UMCS will start and stop the primary and secondary pumps in sequence based on the signal from an outside-air temperature sensor as shown. The UMCS will enable local control of the hot water boiler and boiler circulating pump when the primary pump is operating. The UMCS will control the primary loop hot water supply temperature by modulating the hot water boiler bypass valve in response to a temperature sensor located in the hot water supply line to maintain its setpoint. The UMCS will reset the hot water supply temperature setpoint with respect to outside air temperature in a linear schedule as shown. Reduced-flow control of the hot water bypass valve will be coordinated with the boiler manufacturer's recommendations and boiler safety settings. The UMCS will disable boiler operation when the primary pump is off. The boiler circulating pump will remain in operation for a preset adjustable time period after the boiler is disabled.

(2) Occupied Mode. The UMCS will modulate the secondary heating control valve when the secondary zone pump is operating) to maintain the heating zone occupied space temperature setpoint.

(3) Unoccupied Mode. The UMCS will modulate the secondary heating control valve when the secondary zone pump is operating) to maintain the heating zone unoccupied space temperature.

d. High-Temperature Hot Water/Hot Water Converter and Primary/Secondary Heating System Sequence of Operation (Figure 8-4 and Table 8-4).

(1) All Modes. The UMCS will start and stop the primary and secondary pumps in sequence based on the signal from an outside-air temperature sensor as shown. The UMCS will enable control of the high temperature hot water/hot water converter control valve when the primary pump is operating. The UMCS will control the primary loop hot water supply temperature by modulating the high temperature hot water control valve in response to a temperature sensor located in the hot water supply line to maintain its setpoint. The UMCS will reset the hot water supply temperature setpoint with respect to the outside air temperature in a linear schedule as shown.

(2) Occupied Mode. The UMCS will modulate the secondary heating control valve when the secondary zone pump is operating) to maintain the heating zone occupied space temperature setpoint.

(3) Unoccupied Mode. The UMCS will modulate the secondary heating control valve when the secondary zone pump is operating) to maintain the heating zone unoccupied space temperature.

e. Steam/Hot Water Converter with Dual Temperature Distribution System Sequence of Operation (Figure 8-5 and Table 8-5).

(1) All Modes. The UMCS will start and stop the distribution pump based on the signal from an outside-air temperature sensor as shown. The UMCS will enable control of the steam/hot water converter control valve when the distribution pump is operating and the system is in heating mode. When the system is not in heating mode, control of the steam valve will be disabled. Heating and cooling modes will be initiated by the UMCS and confirmed by monitoring the position of the changeover valves. UMCS will not make the heating to cooling changeover until the return water temperature drops below 90 degrees F and will not make the cooling to heating changeover until the return water temperature raises above 60 degrees F.

(2) Heating Mode. When the heating mode is selected, the system changeover valves will close to the chilled water flow and will open to flow through the steam/hot water converter. The UMCS will control the hot water supply temperature by modulating the steam control valve in response to a temperature sensor in the hot water supply line to maintain its setpoint. The UMCS will reset the hot water supply temperature setpoint with respect to the outside air temperature in a linear schedule as shown.

(3) Cooling Mode. When the cooling mode is selected, the steam control valve will be closed, the system changeover valves will close to the hot water flow and open to the chilled water flow. Chilled water temperature control will remain under local controls.

f. High-Temperature Hot Water/ Hot Water Converter with Dual Temperature Distribution System Sequence of Operation (Figure 8-6 and Table 8-6).

(1) All Modes. The UMCS will start and stop the distribution pump based on the signal from an outside-air temperature sensor as shown. The UMCS will enable control of the high temperature hot water/hot water converter control valve when the distribution pump is operating and the system is in heating mode. When the system is not in heating mode, control of the high temperature hot water valve will be disabled. Heating and cooling modes will be initiated by the UMCS and confirmed by monitoring the position of the changeover valves. UMCS will not make the heating to cooling changeover until the return water temperature drops below 90 degrees F and will not make the cooling to heating changeover until the return water temperature raises above 60 degrees F.

(2) Heating Mode. When the heating mode is selected, the system changeover valves will close to the chilled water flow and will open to flow through the high temperature hot water converter. The UMCS will control the hot water supply temperature by modulating the high temperature hot water control valve in response to a temperature sensor in the hot water supply line to maintain its setpoint. The UMCS will reset the hot water supply temperature setpoint with respect to the outside air temperature in a linear schedule as shown.

(3) Cooling Mode. When the cooling mode is selected, the high temperature hot water control valve will be closed, the system changeover valves will close to the hot water flow and open to the chilled water flow. Chilled water temperature control will remain under local controls.

g. Dual-Temperature System with Hot Water Boiler and Air-Cooled Chiller Sequence of Operation (Figure 8-7 and Table 8-7).

(1) All Modes. The UMCS will start and stop the distribution pump based on the signal from an outside-air temperature sensor as shown. The UMCS will enable control of the hot water boiler bypass valve when pump is operating and the system is in heating mode. When the system is not in heating mode the boiler bypass valve will be disabled. The UMCS will enable control of the air-cooled chiller when the distribution pump is operating and the system is in cooling mode. Heating and cooling modes will be initiated by the UMCS and confirmed by monitoring the position of the changeover valves. UMCS will not make the heating to cooling changeover until the return water temperature drops below 90 degrees F and will not make the cooling to heating changeover until the return water temperature rises above 60 degrees F.

(2) Heating Mode. When the heating mode is selected, the system changeover valves will close to the chilled water flow and will open to flow through the hot water boiler. The UMCS will enable local control of the hot water boiler. The UMCS will control the hot water supply temperature by modulating the hot water boiler bypass valve in response to a temperature sensor located in the hot water supply line to maintain its setpoint. The UMCS will reset the hot water supply temperature setpoint with respect to the outside air temperature in a linear schedule as shown. Reduced-flow control of the hot water bypass valve will be coordinated with the boiler manufacturer's recommendations and boiler safety settings. The UMCS will disable boiler operation when the distribution pump is off. The UMCS shall reset the hot water supply temperature setpoint with respect to outside air temperature in a linear schedule as shown.

(3) Cooling Mode. When the cooling mode is selected, the hot water boiler bypass valve will be closed to the boiler, the system changeover valves will close to the hot water flow and open to the chilled water flow. The UMCS will enable local control of the air-cooled chiller and condenser. Chilled water supply temperature will remain under local controls. When the distribution pump is not operating the air-cooled chiller local controls will be disabled.

h. Water-Cooled Chiller System Sequence of Operation (Figure 8-8 and Table 8-8).

(1) All Modes. The UMCS will enable and disable the chiller plant operation based on occupancy schedule, heating/cooling operation, and outside air temperature. When the chiller is stopped, the chilled water and condenser water pumps shall have delayed shutdown after compressor shutdown.

(2) Chiller Control. The UMCS will first start the chilled water pump and the condenser water pump. The chiller local control interlocks will operate the chiller to maintain a constant chilled water supply temperature after flow has been established. The UMCS will reset the chiller's local control chilled water supply temperature setpoint based on the chilled water temperature as shown.

(3) Cooling Tower Control. The UMCS will start/stop the cooling tower fan, modulate the condenser water bypass control valve, and select the fan speed as required to maintain condenser water supply temperature setpoint. When the chiller is stopped, the chilled water and condenser water pumps will have delayed shutdown after compressor shutdown.

i. Multizone Air Handling System with Hot Water and Chilled Water Coils Sequence of Operation (Figure 8-9 and Table 8-9).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The minimum outside air damper will open. The maximum outside-air, return-air, and relief-air dampers will be modulated under mixed-air temperature and economizer control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Supply-Fan and Return-Fan Control.

(a) Occupied Mode. Supply and return fans will start in sequence, and will operate continuously.

(b) Unoccupied Mode. Supply and return fans will be cycled on and off according to the night setback control setpoint.

(3) Hot-Deck Heating Coil - All Modes. The UMCS will modulate the control valve from the signal of a temperature-sensing element and transmitter located in the coil discharge air to maintain the setpoint. The UMCS will reset the hot-deck temperature setpoint with respect to the coldest space zone temperature signal as directed by the hot deck-cold deck temperature reset program.

(4) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply and return fans, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature device setpoint. Return to the expected mode of operation will require manual reset at the low temperature device. The UMCS will indicate an alarm condition when the low temperature device trips.

(5) Cold-Deck Cooling Coil.

(a) Occupied Mode. The control valve will be modulated by the UMCS from the signal of a temperature-sensor located in the coil discharge air to maintain the setpoint. The UMCS will reset the cold-deck temperature setpoint with respect to the hottest space zone temperature as directed by the hot deck-cold deck temperature reset program.

(b) Unoccupied Mode. The UMCS will close the cooling-coil control valve to the coil.

(6) Mixed-Air Temperature Control. When the UMCS places the system in the economizer operation, it will modulate the dampers from the signal of a temperature sensor in the mixed-air stream to maintain the setpoint based on the conditions shown in Table 8-17.

Table 8-17. Mixed-Air Damper Modulation.

| Condition No. | Description | Control |
|---|---|---|
| 1 | OA temperature<br>< SA temperature<br>< Changeover temperature | Modulate OA, RA, and relief dampers to maintain mixed air temperature at cold deck supply temperature setpoint minus 2 degrees F. |
| 2 | SA temperature<br>< OA temperature<br>< Changeover temperature | Set OA and relief dampers at 100% open; RA dampers closed. |
| 3 | SA temperature<br>< Changeover temperature<br>< OA temperature | Set OA and relief dampers at their minimum positions, and set RA damper at its corresponding open position. |

(a) Zone-Damper Control - All Modes. A space temperature sensor for each zone will signal the UMCS to gradually operate the zone-mixing damper to heat and cool its respective zone by mixing cold-deck air and hot-deck air to maintain the zone setpoint. On a rise in space temperature, the hot-deck damper will gradually close, and the cold-deck damper will gradually open.

(b) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and the return fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan and the return fan will require manual reset at the smoke detectors.

j. Dual Duct Air Handling System with Hot Water and Chilled Water Coils Sequence of Operation (Figure 8-10 and Table 8-10).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The minimum outside-air damper will open. The maximum outside-air, return-air, and relief-air dampers will be modulated under mixed-air temperature and economizer control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Supply-Fan and Return-Fan Control.

(a) Occupied Mode. Supply and return fans will start in sequence, and will operate continuously.

(b) Unoccupied Mode. Supply and return fans will cycle on and off according to the night setback control setpoint.

(3) Hot-Deck Heating Coil - All modes. The UMCS will modulate the control valve from the signal of a temperature-sensor located in the coil discharge air to maintain the setpoint. The UMCS will reset the hot-deck temperature setpoint with respect to the coldest space zone temperature as directed by the hot deck-cold deck temperature reset program.

(4) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply and return fans, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature setpoint. Return to the expected mode of operation will require manual reset at the low temperature device. The UMCS will indicate an alarm condition when the low temperature device trips.

(5) Cold-Deck Cooling Coil.

(a) Occupied Mode. The control valve will be modulated by the UMCS from the signal of a temperature-sensor located in the coil discharge air to maintain the setpoint. The UMCS will reset the cold-deck temperature setpoint with respect to the hottest space zone temperature in a linear schedule as shown.

(b) Unoccupied Mode. The UMCS will close the cooling-coil control valve to the coil.

(6) Mixed-Air Temperature Control. When the UMCS places the system in the economizer operation, it will modulate the dampers from the signal of a temperature sensor in the mixed-air stream to maintain the setpoint based on the conditions shown in Table 8-18.

Table 8-18. Mixed-Air Damper Modulation.

| Condition No. | Description | Control |
|---|---|---|
| 1 | OA temperature<br>< SA temperature<br>< Changeover temperature | Modulate OA, RA, and relief dampers to maintain mixed air temperature at cold deck supply temperature setpoint minus 2 degrees F. |

| | | |
|---|---|---|
| 2 | SA temperature<br>< OA temperature<br>< Changeover temperature | Set OA and relief dampers at 100% open; RA dampers closed. |
| 3 | SA temperature<br>< Changeover temperature<br>< OA temperature | Set OA and relief dampers at their minimum positions, and set RA damper at its corresponding open position. |

(7) Dual-Duct Terminal Box - All Modes. A space temperature sensor for each zone will signal the UMCS to gradually operate the control dampers of the dual-duct box to heat and cool its respective zone by mixing cold-deck air and hot-deck air to maintain the zone setpoint. On a rise in space temperature, the hot-deck damper will gradually close, and the cold-deck damper will gradually open.

(8) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and the return fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan and the return fan will require manual reset at the smoke detectors.

k. Bypass Multizone Air Handling System with Hot Water and Chilled Water Coils Sequence of Operation (Figure 8-11 and Table 8-11).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The minimum outside-air damper will open. The maximum outside-air, return-air, and relief-air dampers will be modulated under mixed-air temperature and economizer control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Supply-Fan and Return-Fan Control.

(a) Occupied Mode. Supply and return fans will start in sequence and will operate continuously.

(b) Unoccupied Mode. Supply fan and return fans will cycle on and off according to the night setback control setpoint.

(3) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply and return fans, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature device setpoint as shown. Return to the expected mode of operation will require manual reset at the low temperature device. The UMCS will indicate an alarm condition when the low temperature device trips.

(4) Cold-Deck Cooling Coil.

(a) Occupied Modes. The control valve will be modulated by the UMCS from the signal of a temperature-sensor located in the coil discharge air to maintain the setpoint. The UMCS shall reset the cold-deck temperature setpoint with respect to the hottest space zone temperature as directed by the hot deck-cold deck temperature reset program.

(b) Unoccupied Mode. The UMCS will close the cooling-coil control valve to the coil.

(5) Mixed-Air Temperature Control. When the UMCS places the system in the economizer operation, it will modulate the dampers from the signal of a temperature sensor in the mixed-air stream to maintain the setpoint based on the conditions shown in Table 8-19.

Table 8-19. Mixed-Air Damper Modulation.

| Condition No. | Description | Control |
|---|---|---|
| 1 | OA temperature<br>< SA temperature<br>< Changeover temperature | Modulate OA, RA, and relief dampers to maintain mixed air temperature at cold deck supply temperature setpoint minus 2 degrees F. |
| 2 | SA temperature<br>< OA temperature<br>< Changeover temperature | Set OA and relief dampers at 100% open; RA dampers closed. |
| 3 | SA temperature<br>< Changeover temperature<br>< OA temperature | Set OA and relief dampers at their minimum positions, and set RA damper at its corresponding open position. |

(6) Zone-Damper and Heating Coil Control - All Modes. A space temperature sensor for each zone will signal the UMCS to modulate the zone-mixing damper and heating coil valve to heat and cool its respective zone by mixing cold-deck air and bypass-deck air to maintain the zone setpoint. On a rise in space temperature, the heating coil valve will gradually close, and after a selected dead band the bypass-deck damper will gradually close, and the cold-deck damper will gradually open in sequence.

(7) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and the return fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan and the return fan will require manual reset at the smoke detectors.

l. VAV Air Handling System with Hot Water and Chilled Water Coils Sequence of Operation (Figure 8-12 and Table 8-12).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The minimum outside-air damper will open. The maximum outside-air, return-air, and relief-air dampers will be modulated under mixed-air temperature and economizer control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Supply-Fan Control.

(a) Occupied Mode. The supply fan will start and will operate continuously.

(b) Unoccupied Mode. The supply fan will cycle on and off according to the night setback schedule setpoint.

(3) Supply-Duct Pressure Control. When the supply fan starts, the UMCS will modulate the fan inlet vanes from the signal of a static pressure sensor to maintain the setpoint. When the fan is off the inlet vanes will be closed.

(4) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply fan, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature device's setpoint.

Return to the normal mode of operation will require manual reset at the low temperature device. The UMCS will indicate an alarm condition when the low temperature device trips.

(5) Cooling-Deck Coil and Preheat Coil Control.

(a) Occupied Mode. The control valves will be modulated in sequence by the UMCS from the signal of a temperature-sensor located in the fan discharge- air duct to maintain the setpoint.

(b) Unoccupied Mode. The UMCS will close the cooling-coil control valve to the coil and will open the preheat-coil control valve to the coil.

(6) Mixed-Air Temperature Control. When the UMCS places the system in the economizer operation, it will modulate the dampers from the signal of a temperature sensor in the mixed-air stream to maintain the setpoint based on the conditions shown in Table 8-20.

Table 8-20. Mixed-Air Damper Modulation.

| Condition No. | Description | Control |
|---|---|---|
| 1 | OA temperature<br>< SA temperature<br>< Changeover temperature | Modulate OA, RA, and relief dampers to maintain mixed air temperature at cold deck supply temperature setpoint minus 2 degrees F. |
| 2 | SA temperature<br>< OA temperature<br>< Changeover temperature | Set OA and relief dampers at 100% open; RA dampers closed. |
| 3 | SA temperature<br>< Changeover temperature<br>< OA temperature | Set OA and relief dampers at their minimum positions, and set RA damper at its corresponding open position. |

(7) Pressure-Independent VAV Terminal Box Control. The control damper in the VAV box will modulate in response to the signal from a flow-sensing element (at the inlet or discharge of the VAV terminal box) to the UMCS Unitary Controller. The UMCS will control the VAV box damper from its minimum-flow position to its full-flow position from the signal of a space temperature sensing element and transmitter. When the space temperature decreases, the damper will gradually close. If the space temperature continues to drop after the damper has reached its minimum-flow position, the reheat coil valve will be controlled to maintain the space temperature setpoint.

(8) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan will require manual reset at the smoke detectors.

m. VAV Air Handling System with Return Fan and Hot Water/Chilled Water Coils Sequence of Operation (Figure 8-13 and Table 8-13).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The minimum outside-air damper will open. The maximum outside-air, return-air, and relief-air dampers will be modulated under mixed-air temperature and economizer control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Supply-Fan and Return-Fan Control.

(a) Occupied Mode. Supply fan and return fans will start in sequence and will operate continuously.

(b) Unoccupied Mode. Supply and return fans will cycle on and off according to the night setback schedule setpoint.

(3) Supply-Duct Pressure Control. When the supply fan starts, the UMCS will modulate the fan inlet vanes from the signal of a static pressure sensor to maintain the setpoint. When the fan is off the inlet vanes will be closed.

(4) Return Fan Volume Control. When the return fan starts, the UMCS will modulate the fan inlet vanes from the signals of airflow measurement stations and transmitters in the return and supply ducts in order to maintain a constant flow differential setpoint between supply and return airflows.

(5) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply and return fans, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature device's setpoint. Return to the normal mode of operation will require manual reset at the low temperature device. The UMCS will indicate an alarm condition when the low temperature device trips.

(6) Cooling Coil and Preheat Coil Control.

(a) Occupied Mode. The control valves will be modulated in sequence by the UMCS from the signal of a temperature-sensor located in the supply fan discharge air duct to maintain the setpoint.

(b) Unoccupied Mode. The UMCS will close the cooling-coil control valve to the coil and will open the preheat-coil control valve to the coil.

(7) Mixed-Air Temperature Control. When the UMCS places the system in the economizer operation, it will modulate the dampers from the signal of a temperature sensor in the mixed-air stream to maintain the setpoint based on the conditions shown in Table 8-21.

Table 8-21. Mixed-Air Damper Modulation.

| Condition No. | Description | Control |
|---|---|---|
| 1 | OA temperature<br>< SA temperature<br>< Changeover temperature | Modulate OA, RA, and relief dampers to maintain mixed air temperature at cold deck supply temperature setpoint minus 2 degrees F. |
| 2 | SA temperature<br>< OA temperature<br>< Changeover temperature | Set OA and relief dampers at 100% open; RA dampers closed. |
| 3 | SA temperature<br>< Changeover temperature<br>< OA temperature | Set OA and relief dampers at their minimum positions, and set RA damper at its corresponding open position. |

(8) Pressure-Independent VAV Terminal Box Control. The control damper in the VAV box will modulate in response to the signal from a flow-sensing element at the inlet (or discharge) of the VAV terminal box to the UMCS Unitary Controller. The UMCS will control the VAV box damper from its

minimum-flow position to its full-flow position from the signal of a space temperature sensing element and transmitter. When the space temperature decreases, the damper will gradually close. If the space temperature continues to drop after the damper has reached its minimum-flow position, the reheat coil valve will be controlled to maintain the space temperature setpoint.

(9) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and the return fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan and the return fan will require manual reset at the smoke detectors.

n. Single Zone Air Handling System with Hot Water/Chilled Water Coils and Humidification Sequence of Operation (Figure 8-14 and Table 8-14).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The minimum outside air will open. The maximum outside-air, return-air, and relief-air dampers will be modulated under mixed-air temperature and economizer control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Supply-Fan Control.

(a) Occupied Mode. The supply fan will start and will operate continuously.

(b) Unoccupied Mode. The supply fan will cycle on and off according to the night setback schedule setpoint.

(c) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply and return fans, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature device's setpoint as shown. Return to the normal mode of operation will require manual reset at the low temperature device. The UMCS panel will indicate an alarm condition when the low temperature device trips.

(3) Cooling Coil and Heating Coil Control.

(a) Occupied Mode. The control valves will be modulated in sequence by the UMCS from the signal of the space temperature sensor to maintain its setpoint. On a rise in space temperature, the UMCS will gradually close the heating-coil valve and after passing through a deadband, the UMCS will gradually operate the outside-air damper to admit outside-air beyond the minimum quantity. After the outside air damper is fully open the UMCS will then operate the cooling-coil valve to maintain the setpoint as shown.

(b) Unoccupied Mode - The UMCS will close the cooling-coil control valve to the coil and will open the heating-coil control valve to the coil.

(4) Mixed-Air Temperature Control. When the UMCS places the system in the economizer operation, it will modulate the dampers from the signal of the space temperature sensor to maintain the setpoint based on the conditions shown in Table 8-22.

Table 8-22. Mixed-Air Damper Modulation.

| Condition No. | Description | Control |
|---|---|---|
| 1 | OA temperature < Changeover temperature | Modulate OA and relief dampers open, and the RA dampers closed to maintain the space temperature |

| | | |
|---|---|---|
| | | cooling setpoint. |
| 2 | Changeover temperature < OA temperature | Set OA and relief dampers at their minimum positions, and set RA damper at its corresponding open position. |

(5) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan will require manual reset at the smoke detectors.

(6) Humidity Control.

(a) Occupied Mode. The UMCS will gradually operate the humidifier valve from the signal of the return duct relative-humidity sensor /transmitter to maintain relative-humidity space low limit setpoint. If the return duct relative humidity rises above its space high limit setpoint the UMCS will temporarily transfer control of the cooling coil control valve from temperature control to relative humidity control. When the return duct relative humidity drops to its setpoint, control of the cooling coil control valve will be transferred to the temperature control loop. The UMCS will monitor a duct high limit relative-humidity sensor in the supply duct downstream of the humidifier and will modulate the humidifier valve to a fully closed position when the duct high limit setpoint is exceeded.

(b) Unoccupied Mode. The humidifier valve will be closed.

(7) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan will require manual reset at the smoke detector.

o. Single Zone Air Handling System with Hot Water and DX Refrigeration Coils Sequence of Operation (Figure 8-15 and Table 8-15).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The minimum outside-air damper will open. The maximum outside-air, return-air, and relief-air dampers will be modified under mixed-air temperature and economizer control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Supply-Fan Control.

(a) Occupied Mode. The supply fan will start and will operate continuously.

(b) Unoccupied Mode. The supply fan will cycle on and off according to the night setback schedule setpoint.

(3) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply and return fans, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature device's setpoint as shown. Return to the normal mode of operation will require manual reset at the low temperature device. The UMCS will indicate an alarm condition when the low temperature device trips.

(4) Direct Expansion Cooling Coil and Heating Coil Control.

(a) Occupied Modes. On a rise in space temperature, the UMCS will first gradually close the heating-coil valve. After passing through a deadband. The UMCS will then gradually operate the

outside-air damper to admit outside-air beyond the minimum quantity and after the outside air damper is fully open the UMCS will then operate the DX stages of cooling in sequence.

(b) Unoccupied Mode. Cooling will be off and the heating-coil control valve will open to the coil.

(5) Mixed-Air Temperature Control. When the UMCS places the system in the economizer operation, it will modulate the dampers from the signal of the space temperature sensor to maintain the setpoint based on the conditions shown in Table 8-23.

Table 8-23. Mixed-Air Damper Modulation.

| Condition No. | Description | Control |
|---|---|---|
| 1 | OA temperature < Changeover temperature | Modulate OA and relief dampers open, and the RA dampers closed to maintain the space temperature cooling setpoint. |
| 2 | Changeover temperature < OA temperature | Set OA and relief dampers at their minimum positions, and set RA damper at its corresponding open position. |

(6) Smoke Control. Smoke detectors in the supply-air and return-air ductwork will stop the supply fan and initiate a smoke alarm if smoke is detected at either location. Restarting the supply fan will require manual reset at the smoke detectors.

p. Heating and Ventilating System Sequence of Operation (Figure 8-16 and Table 8-16).

(1) Outside-Air, Return-Air, and Relief-Air Dampers.

(a) Occupied Mode. The outside air will open to its minimum position at start-up. The outside-air, return-air, and relief-air dampers will be modulated under mixed-air temperature control.

(b) Unoccupied Mode. The dampers will return to their normal positions as shown.

(2) Ventilation Delay Mode of Operation. During the ventilation delay mode, the dampers remain positioned in the unoccupied mode while the supply fan runs continuously. Until the ventilation delay mode ends, the HVAC system circulates return air to bring the building to comfort conditions, using a minimum of energy.

(3) Supply-Fan Control.

(a) Occupied Mode. The supply fan will start and will operate continuously.

(b) Unoccupied Mode. The supply fan will cycle on and off according to the night setback schedule setpoint.

(4) Freeze Protection - All Modes. A low temperature device, located as shown, will stop the supply fan, cause the outside-air, return-air, and relief-air dampers to return to their normal position, and will initiate a low-temperature alarm if the temperature drops below the low temperature device's setpoint as shown. Return to the normal mode of operation will require manual reset at the low temperature device. The UMCS panel will indicate an alarm condition when the low temperature device trips.

(5) Heating Coil Control.

(a) Occupied Mode. The control valve will be modulated by the UMCS from the signal of the space temperature sensor to maintain its setpoint. On a rise in space temperature, the UMCS will gradually close the heating coil valve and after passing through a deadband, the UMCS will gradually operate the outside-air damper to admit outside-air beyond the minimum quantity.

(b) Unoccupied Mode. The UMCS will open the heating coil control valve to the coil.

(6) Mixed-Air Temperature Control. The UMCS will modulate the outside air, return air, and relief air dampers from the signal of the space temperature sensor to maintain the space temperature at a control setpoint 4 degrees F higher than the heating setpoint. When the space temperature continues to rise, the outside air and relief air damper shall modulate to 100% open, and the return air damper shall modulate closed, and stay at this position until the space temperature drops below the control setpoint. When the space temperature drops below the control setpoint, the outside air and relief air dampers will modulate to their minimum position and the return air damper will go to its corresponding position.

(7) Smoke Control. Smoke detectors in the supply-air ductwork will stop the supply fan and initiate a smoke alarm if smoke is detected. Restarting the supply fan will require manual reset at the smoke detector.

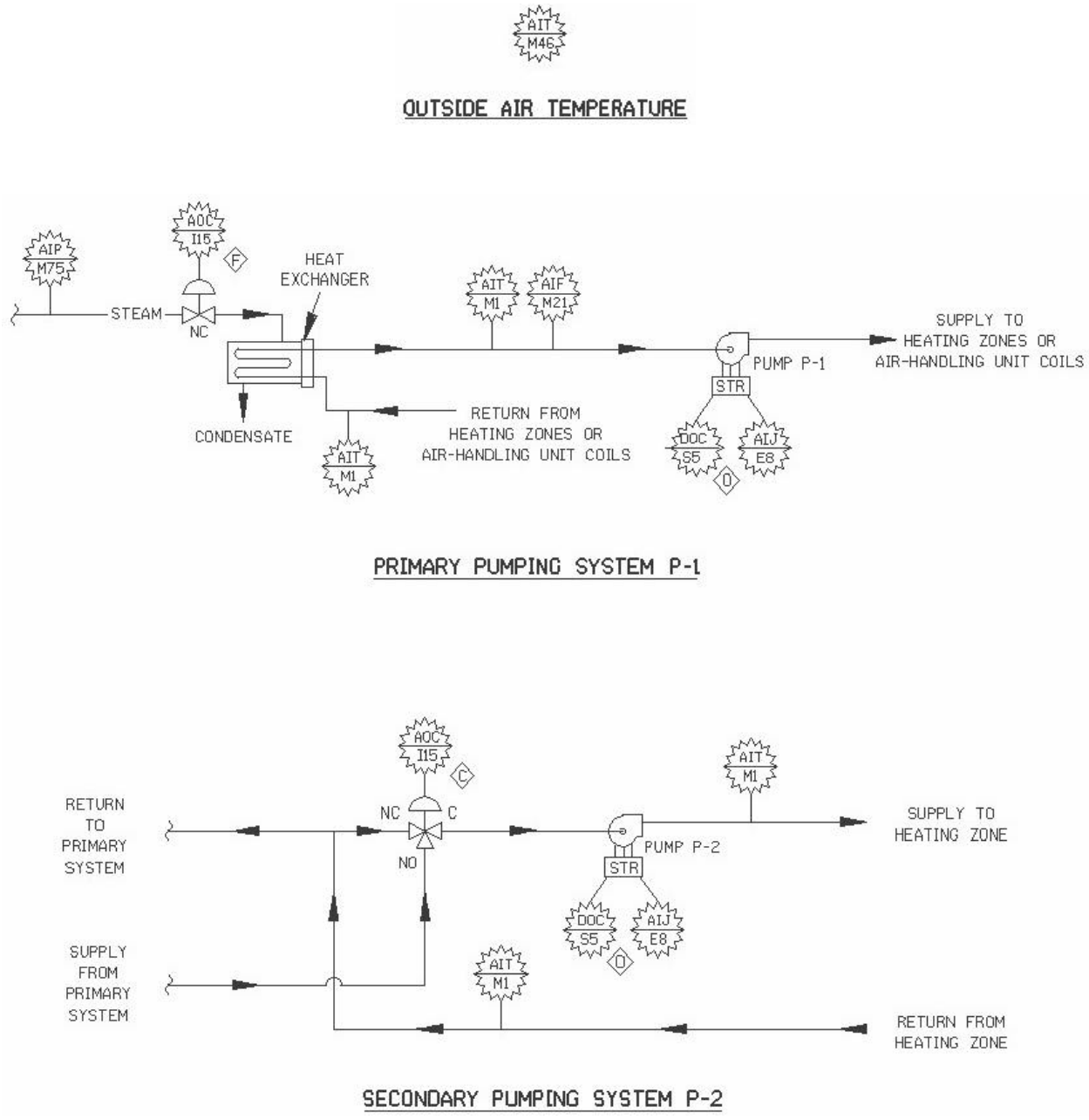



Figure 8-1. Steam/HW Converter and Primary/Secondary Heating System.

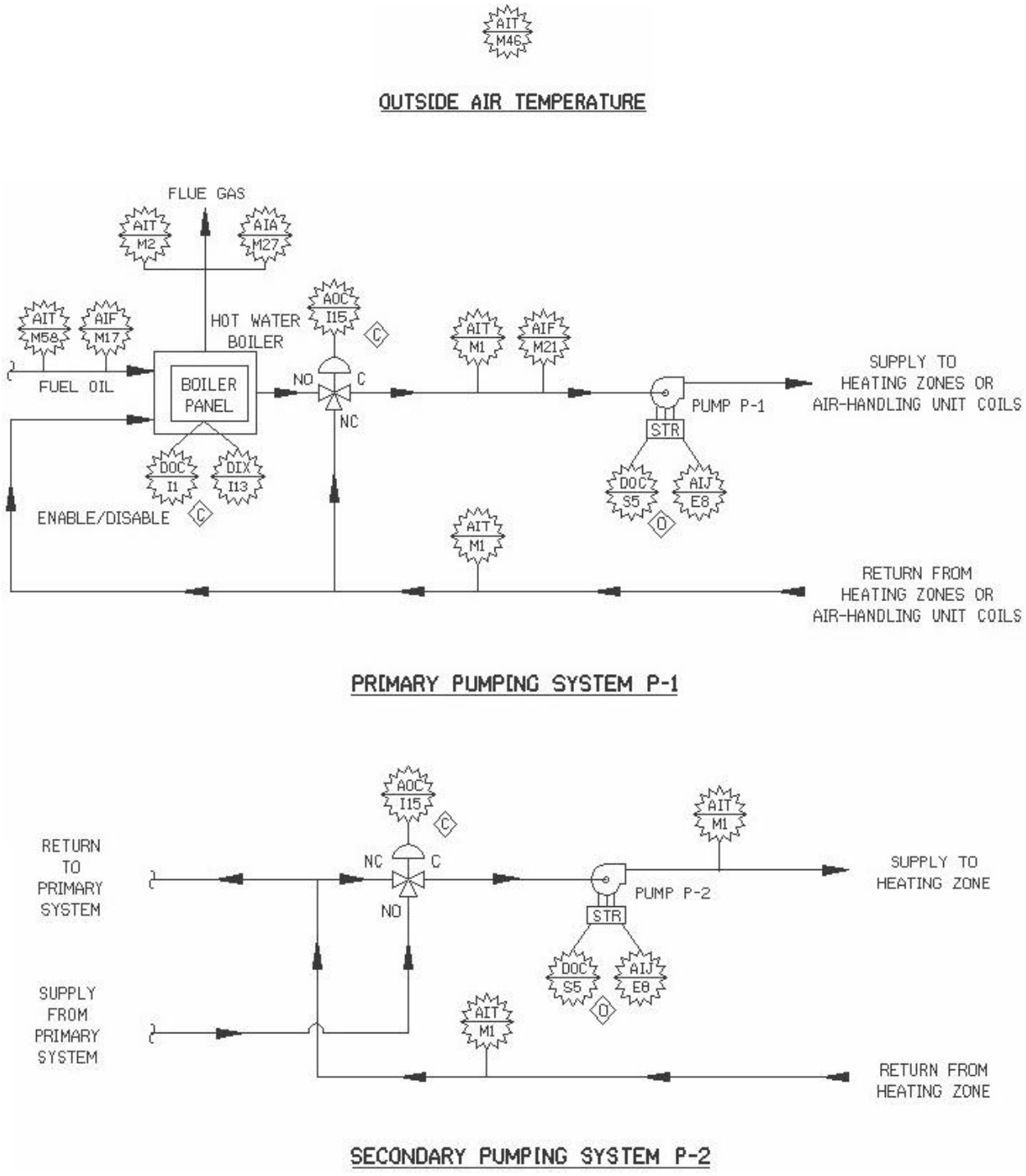



Figure 8-2. Hot Water Boiler and Primary/Secondary Heating System.

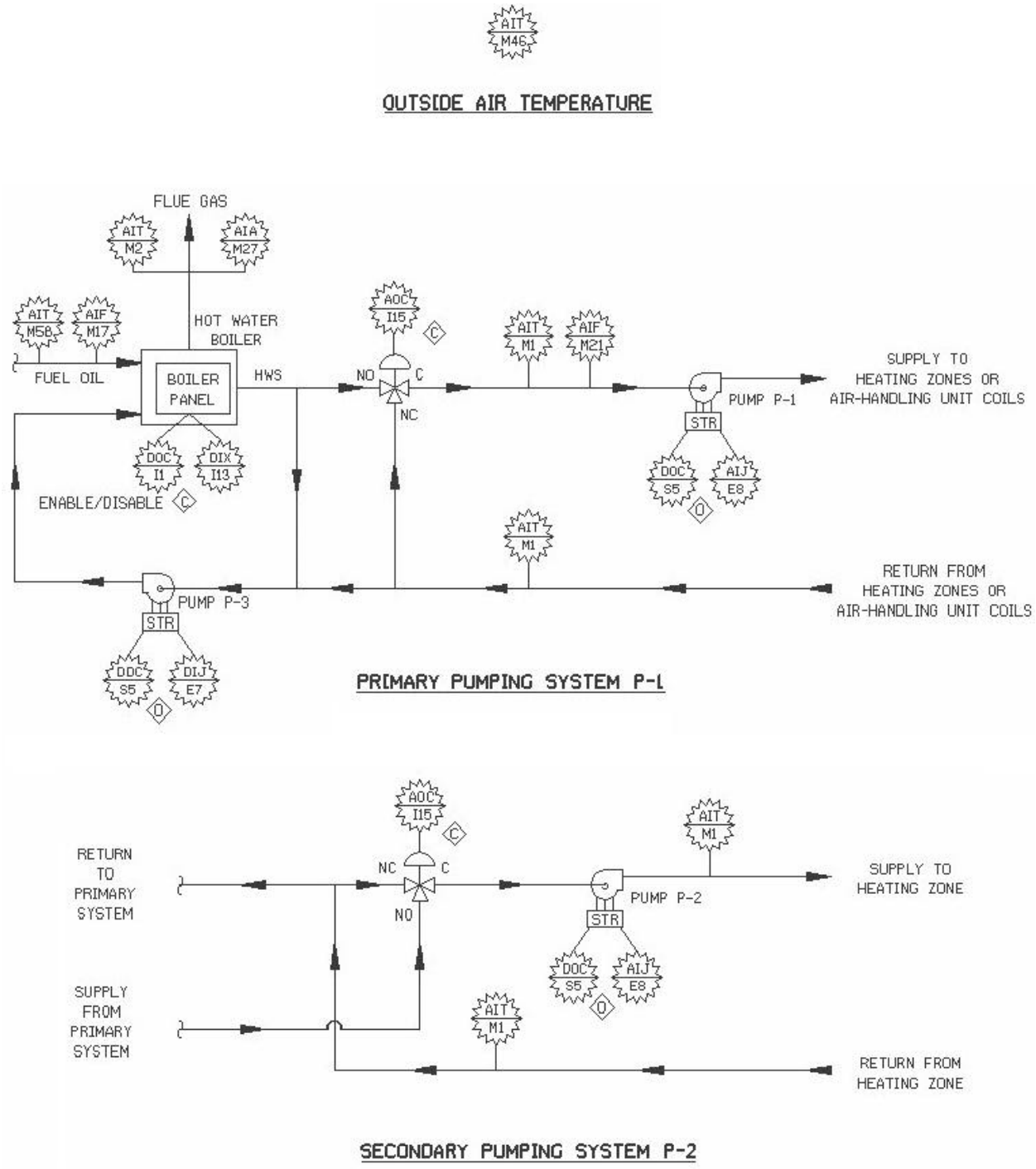
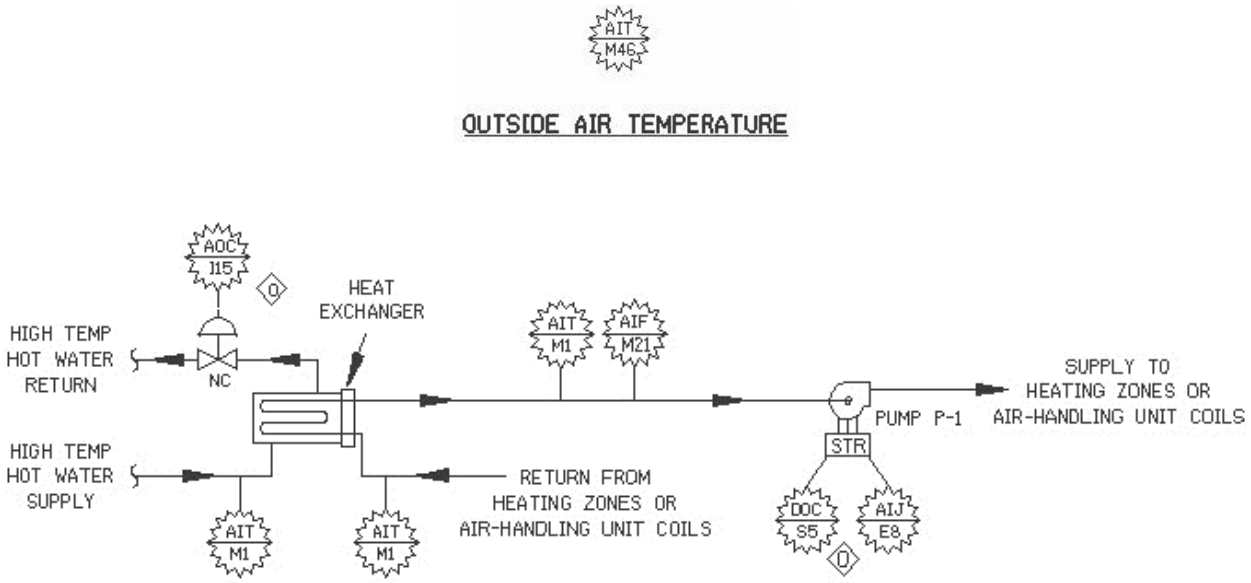



Figure 8-3. Hot Water Boiler with Constant Volume Circulating Loop and Primary/Secondary Heating System.



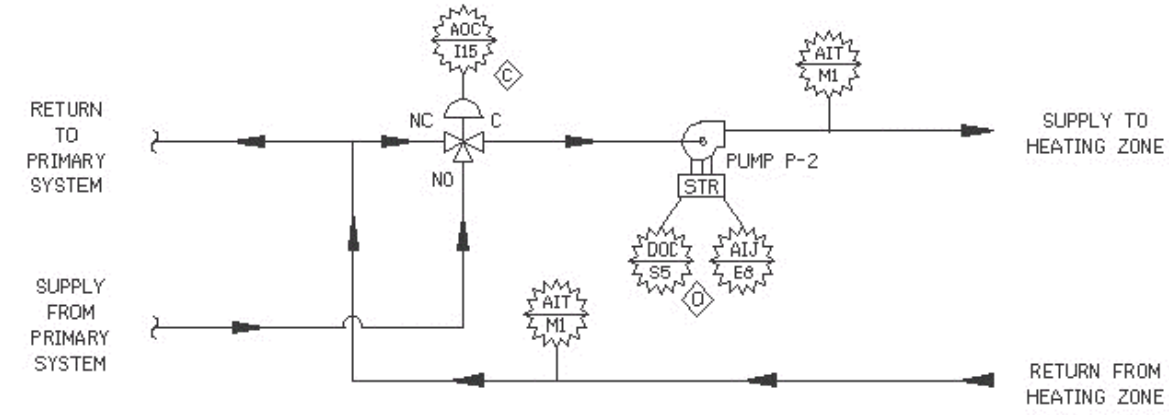




Figure 8-4. High Temperature HW/HW Converter
And Primary/Secondary Heating System.

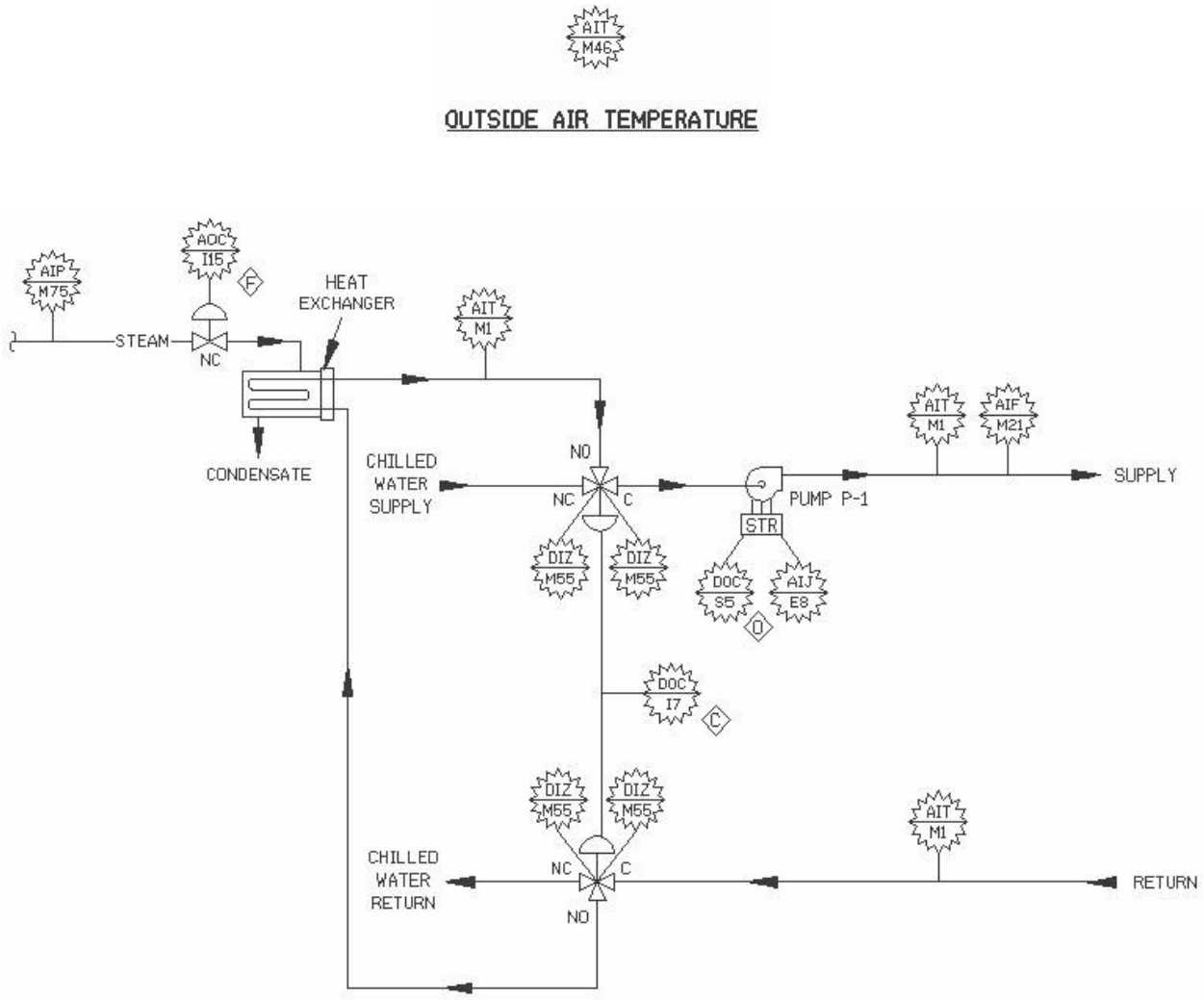



Figure 8-5. Steam/HW Converter with Dual Temperature Distribution System.

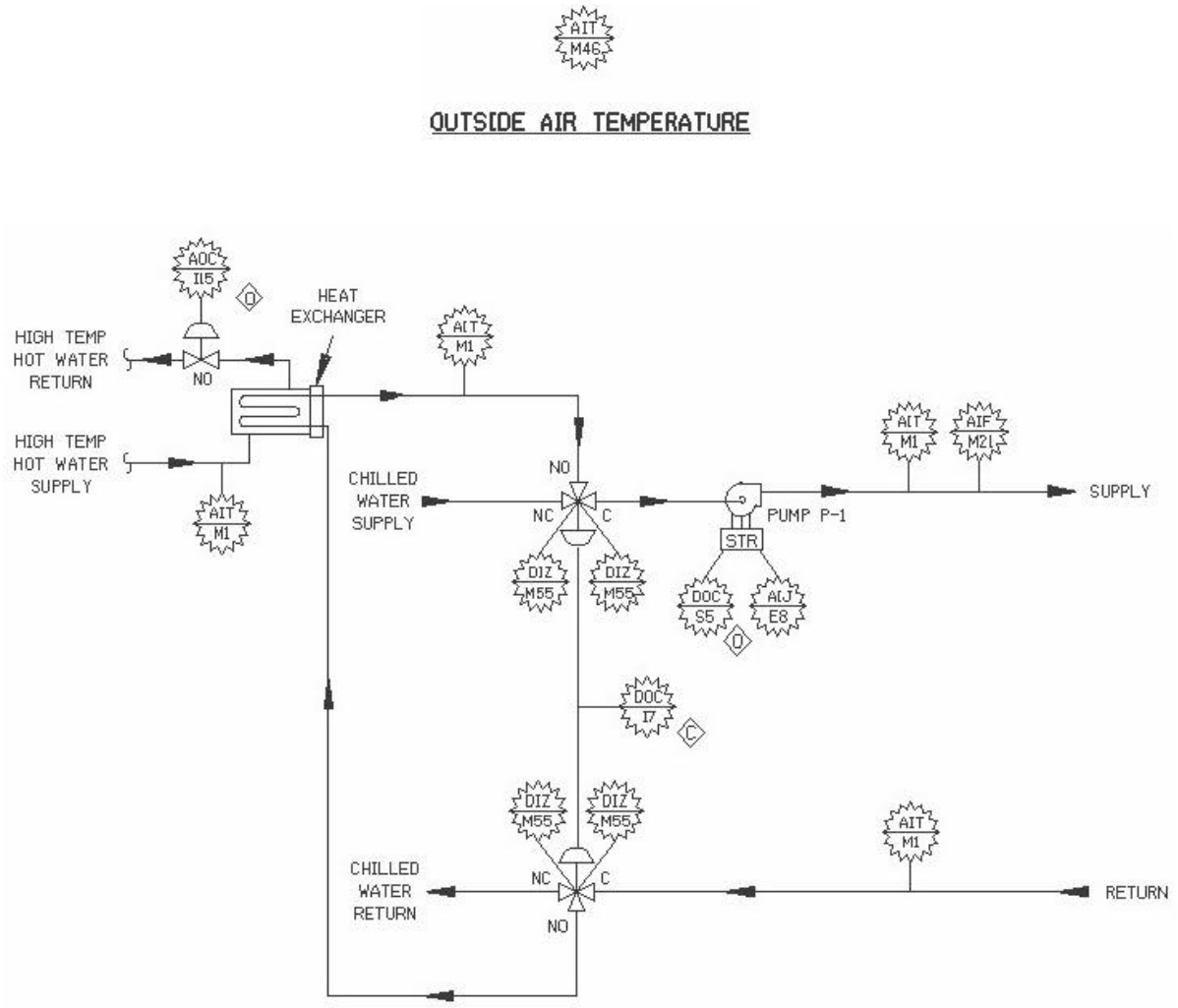



Figure 8-6. High Temperature HW/HW Converter with Dual Temperature Distribution System.

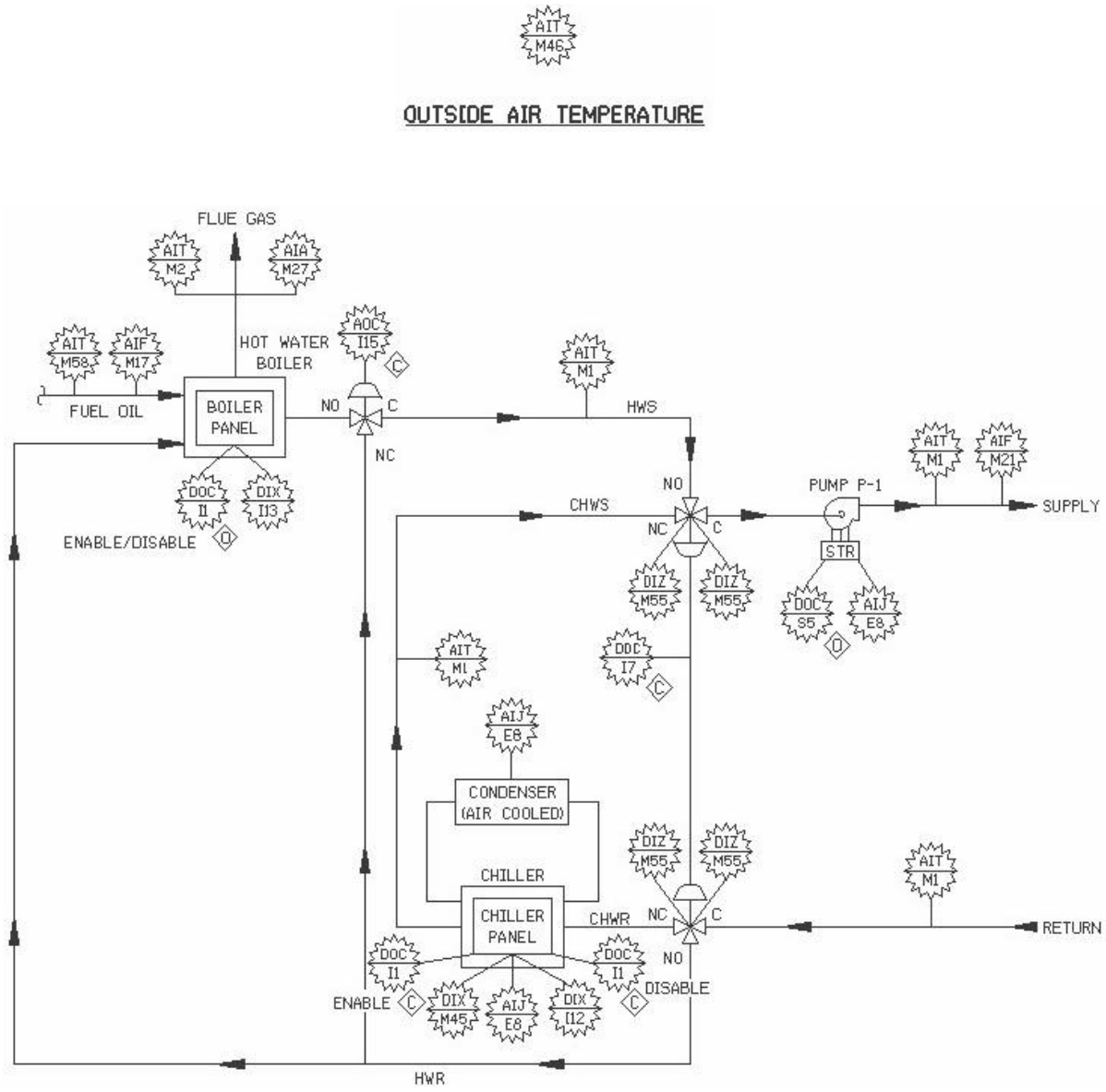



Figure 8-7. Dual Temperature System with Hot Water Boiler and Air-Coiled Chiller.

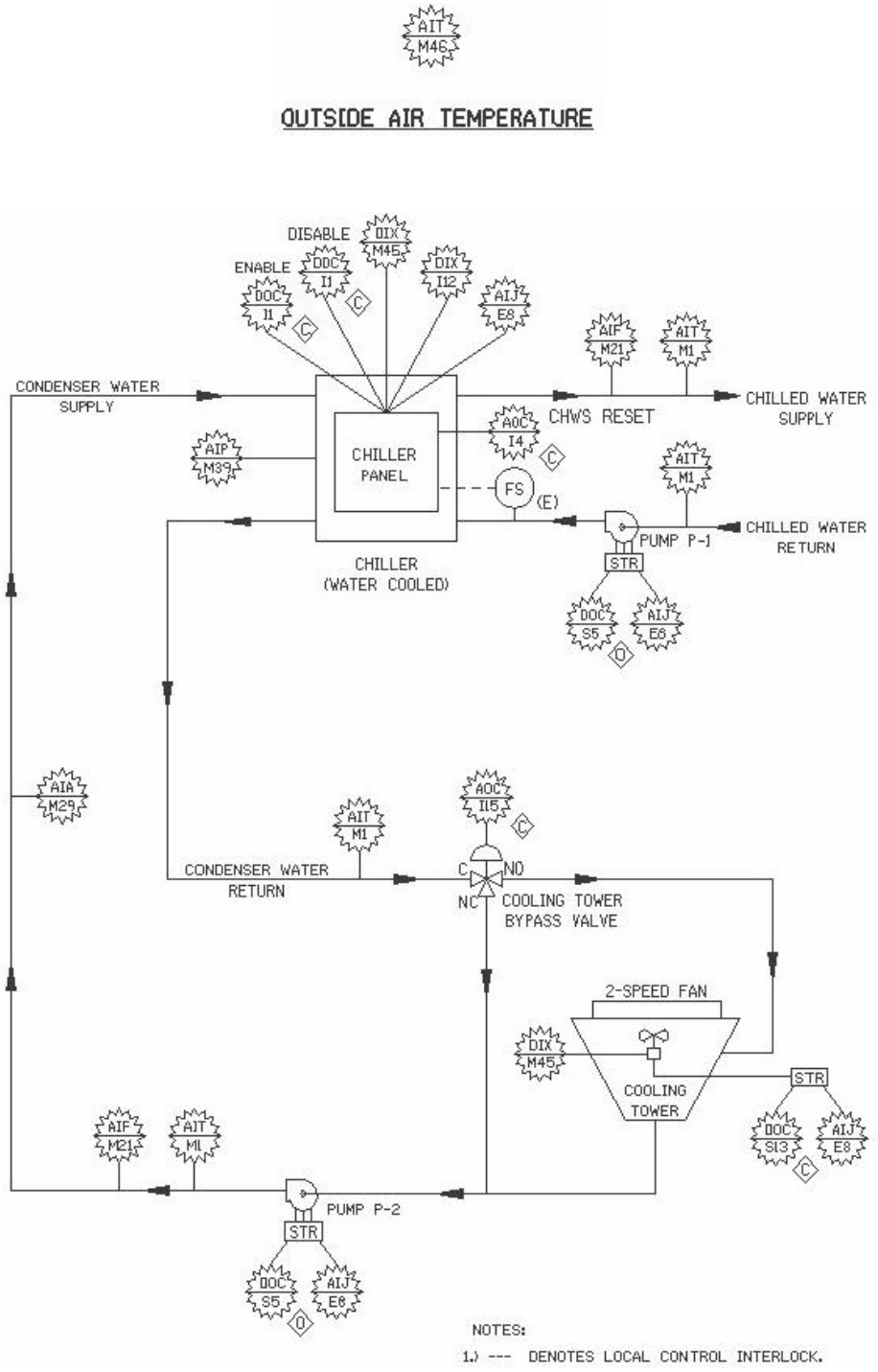



Figure 8-8. Water-Cooled Chiller.

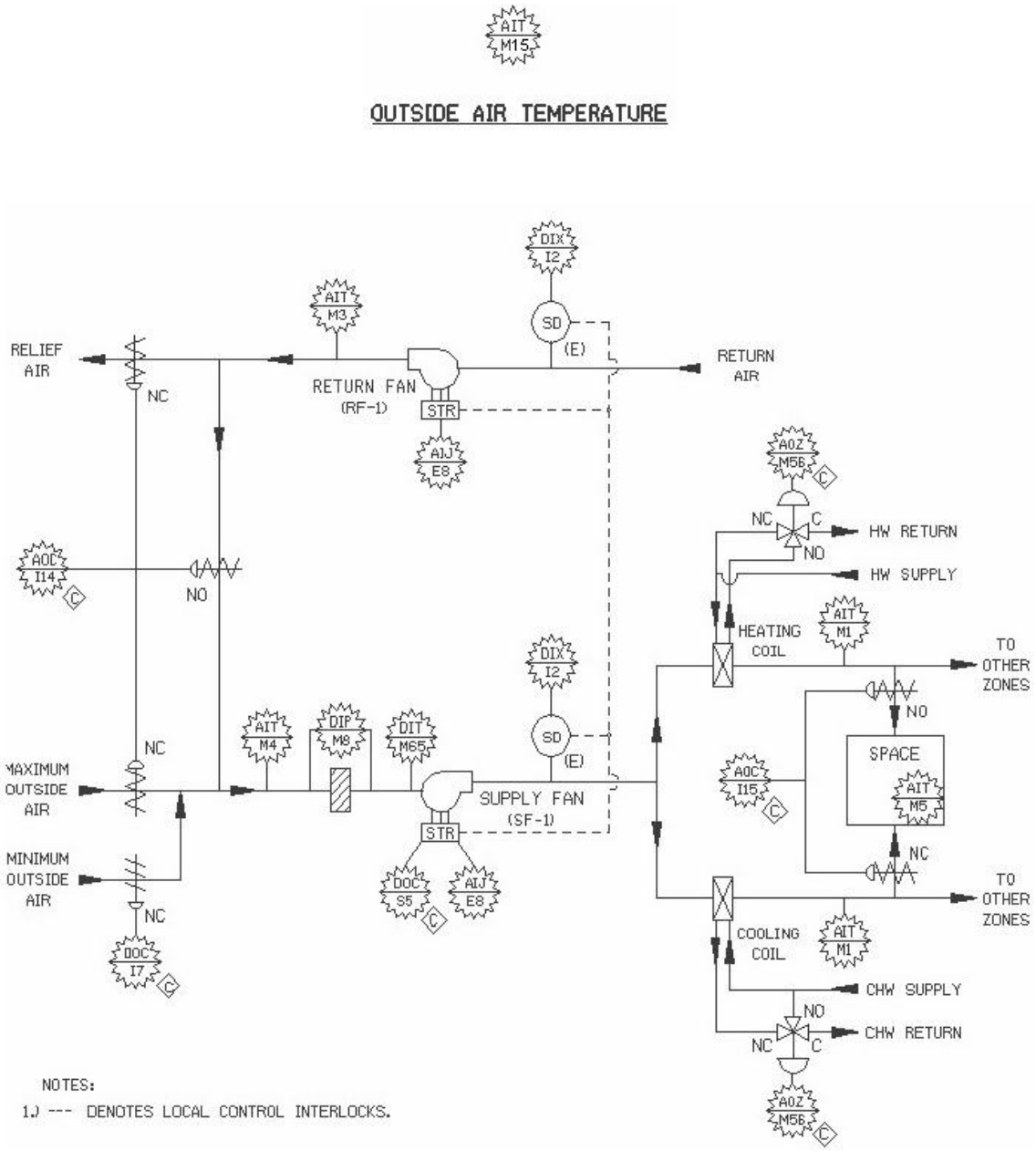



Figure 8-9. Multi-Zone Air Handling System with Hot Water and Chilled Water Coils.

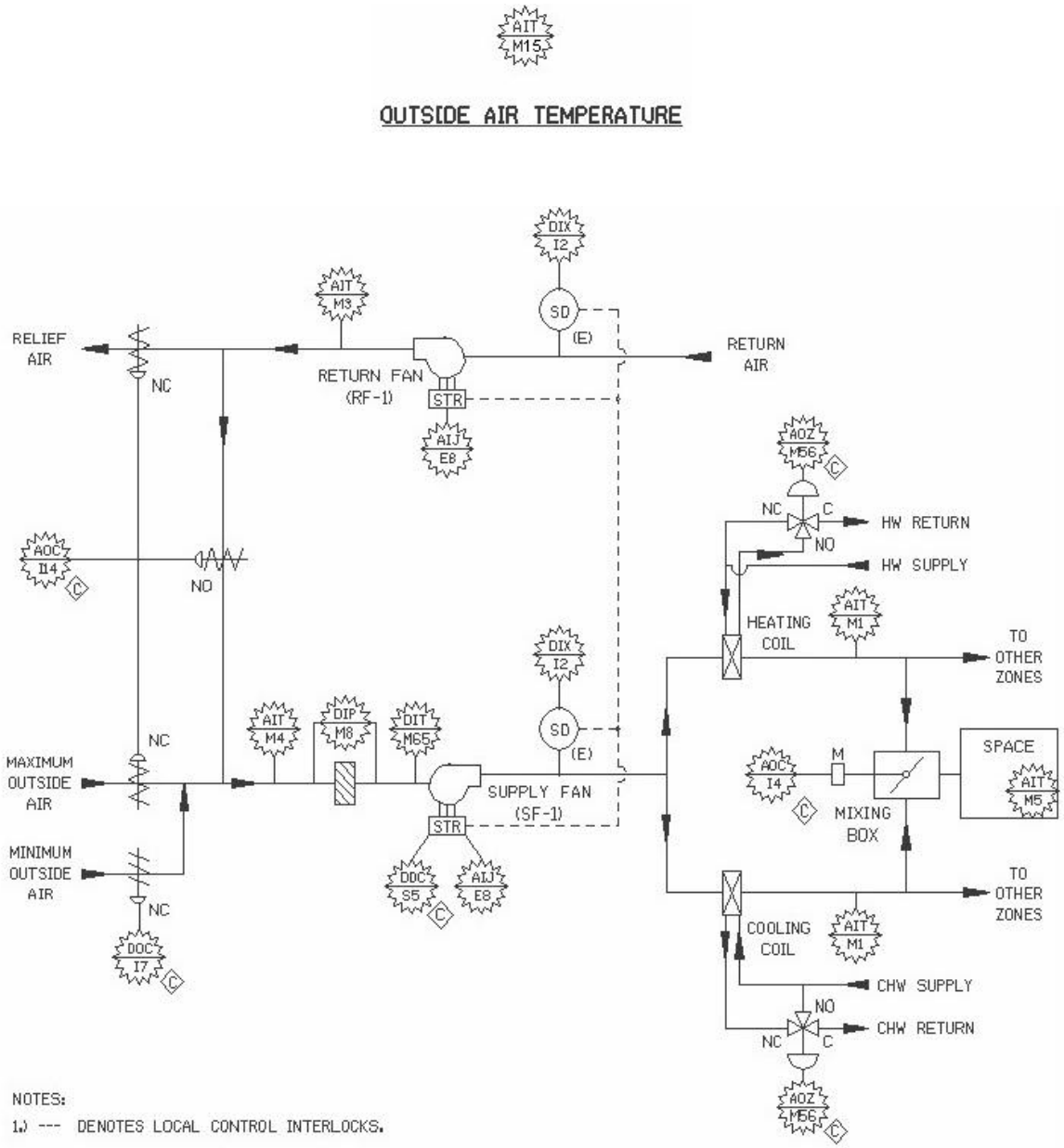



Figure 8-10. Dual Duct Air Handling System with Hot Water and Chilled Water Coils.

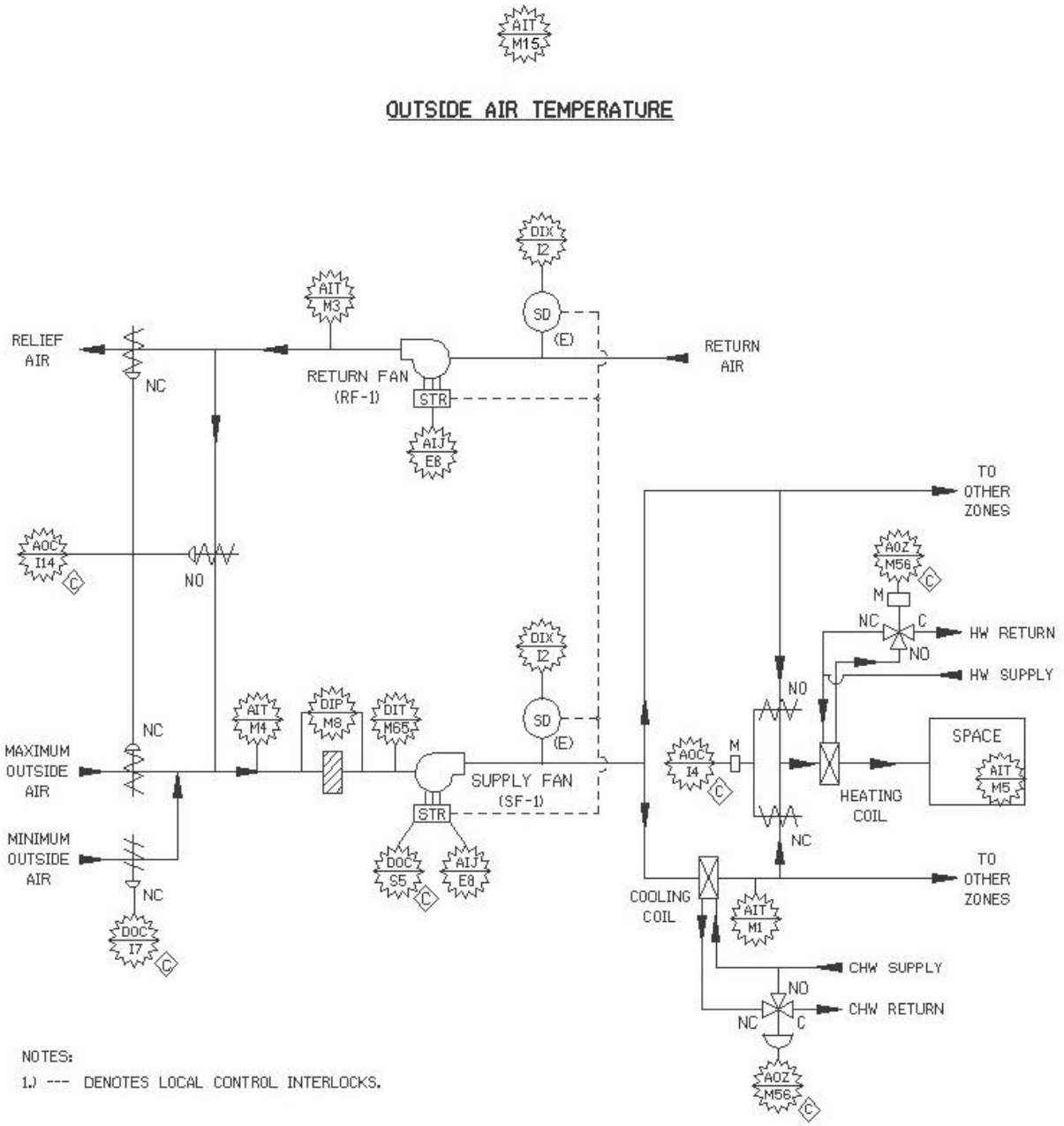



Figure 8-11. Bypass Multi-Zone Air Handling System with Hot Water and Chilled Water Coils.

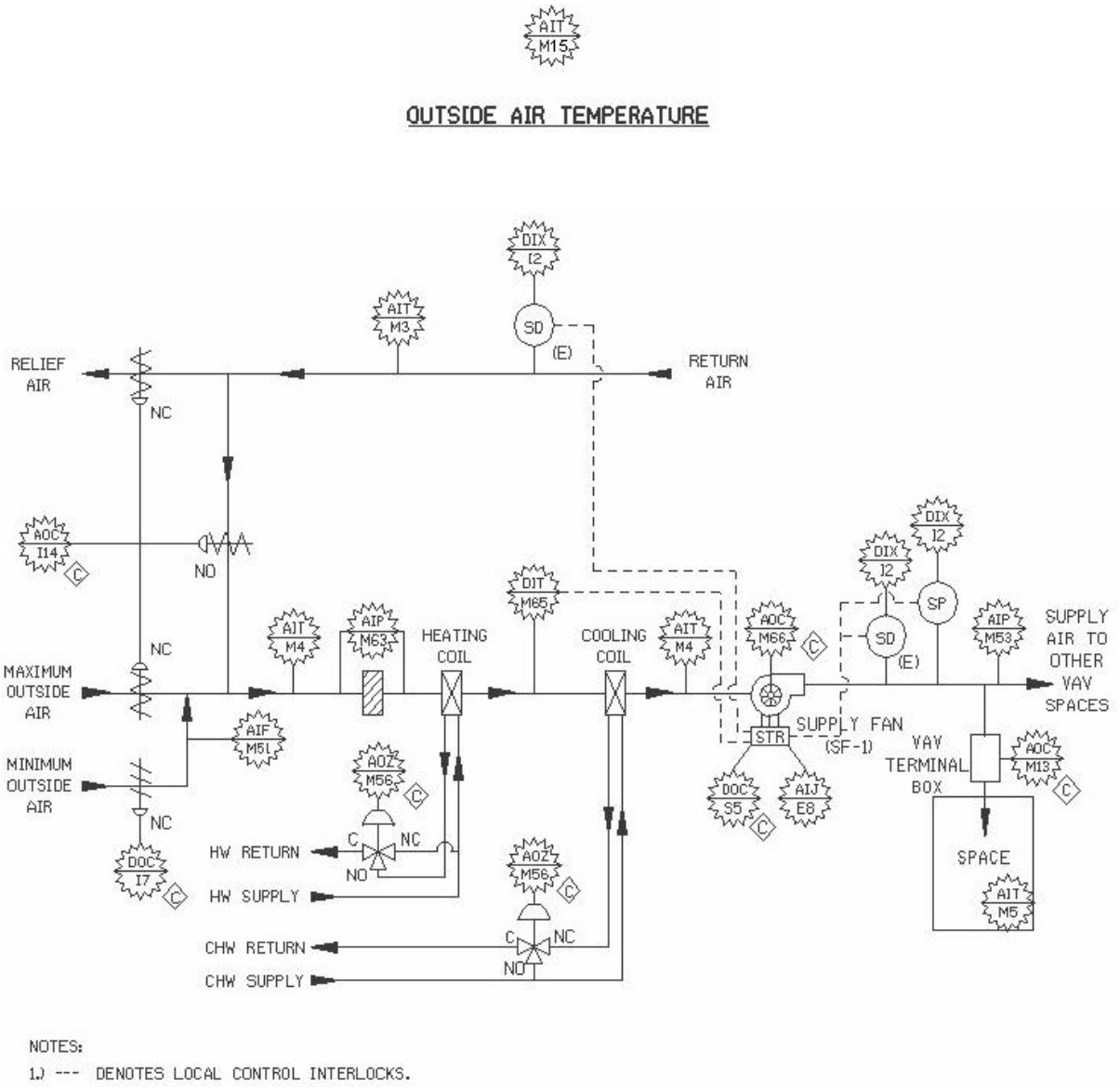



Figure 8-12. VAV Air Handling System with Hot Water and Chilled Water Coils.

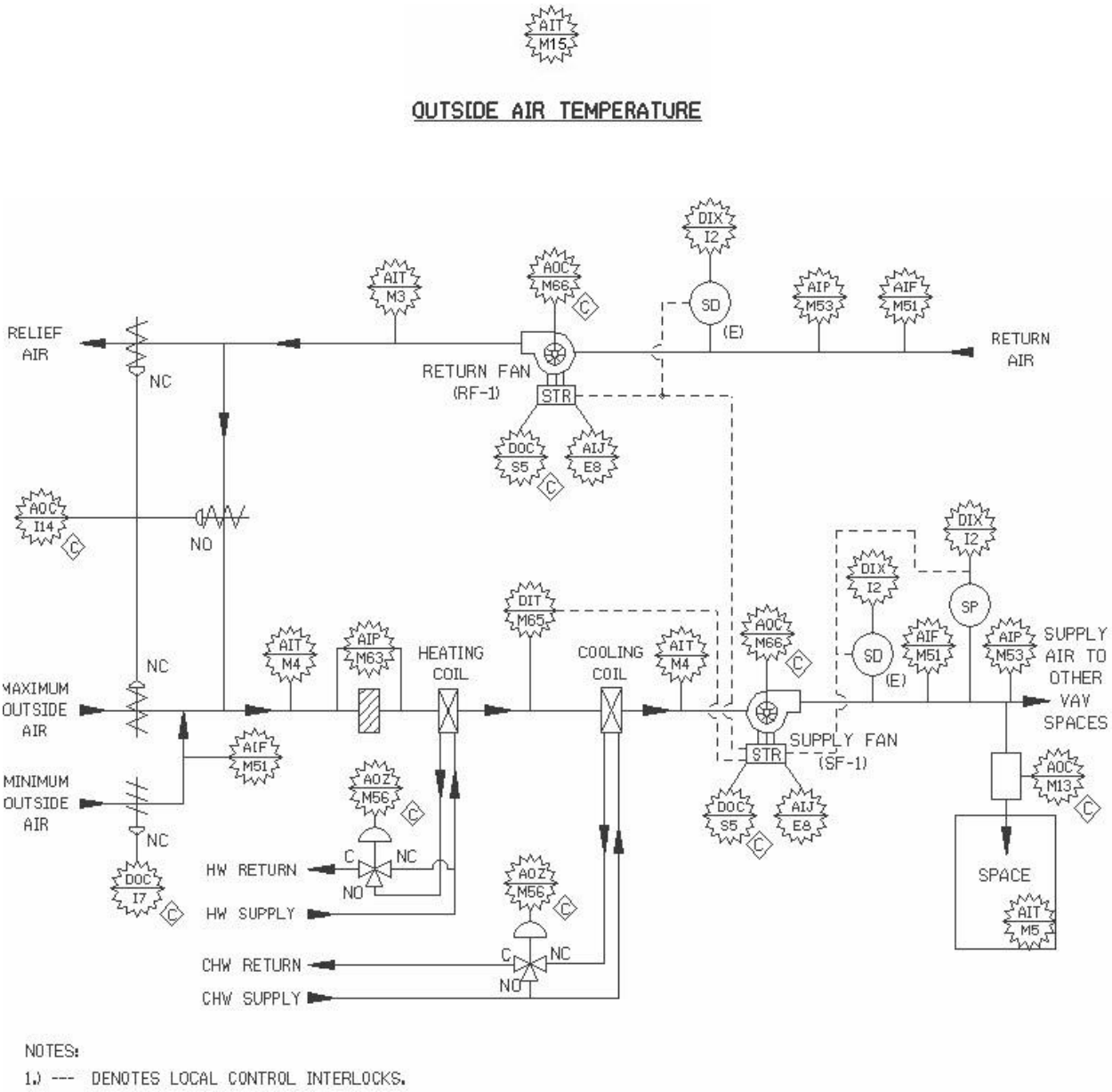



Figure 8-13. VAV Air Handling System with Return Fan and Hot Water/Chilled Water Coils.

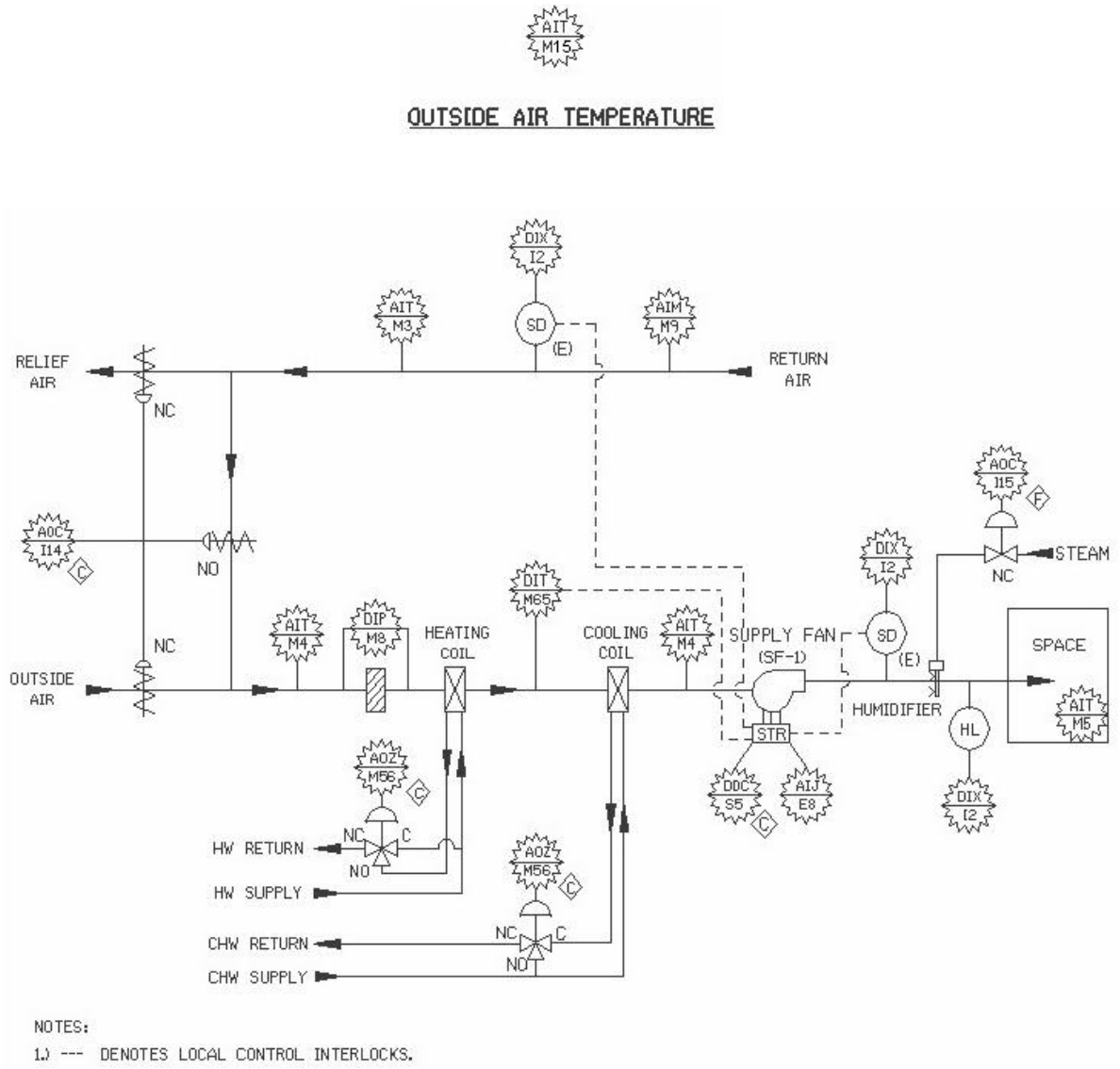



Figure 8-14. Single Zone Air Handling System with Hot Water/Chilled Water Coils and Humidification.

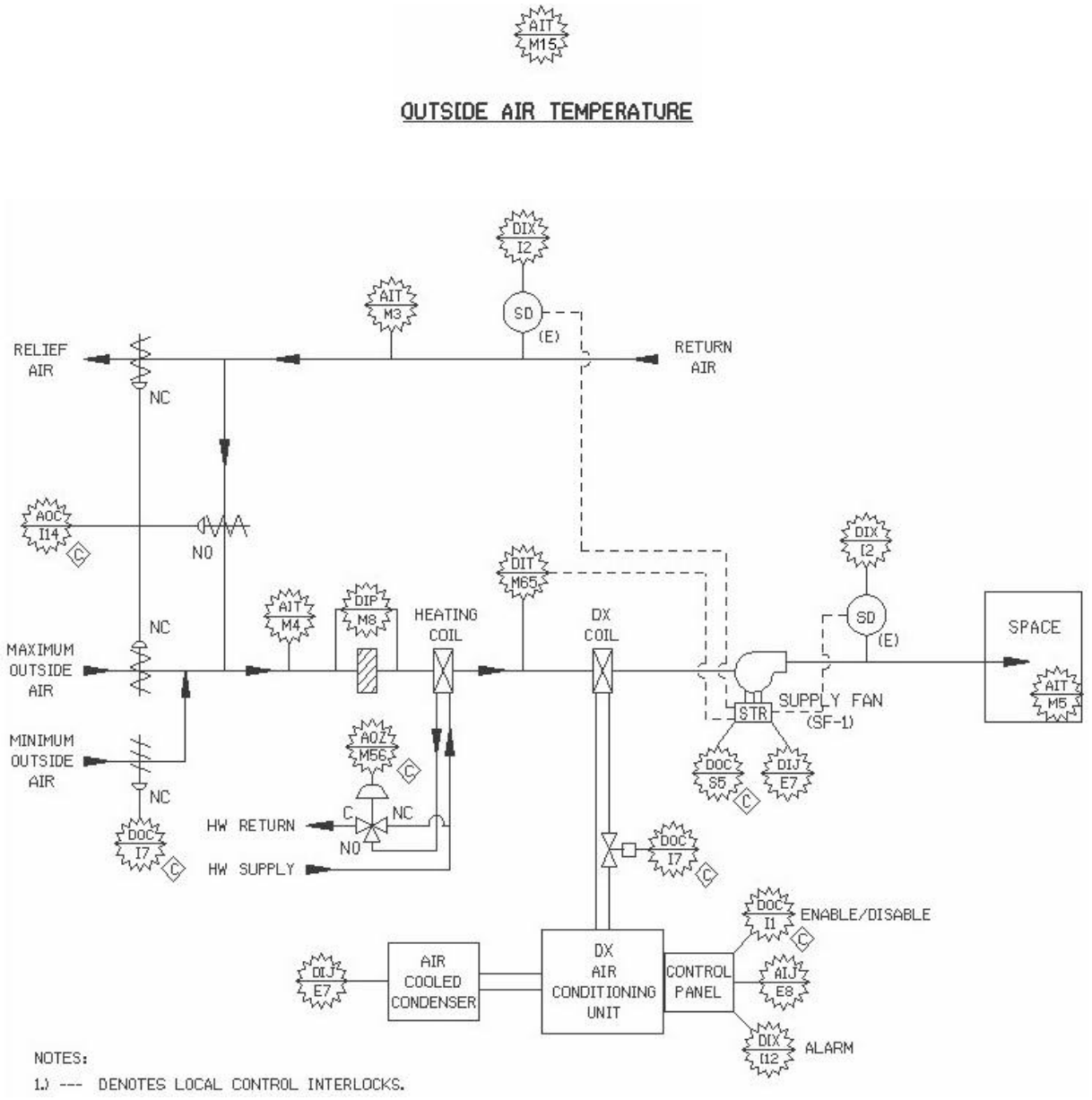



Figure 8-15. Single Zone Air Handling System with Hot Water and DX Refrigeration Coils.

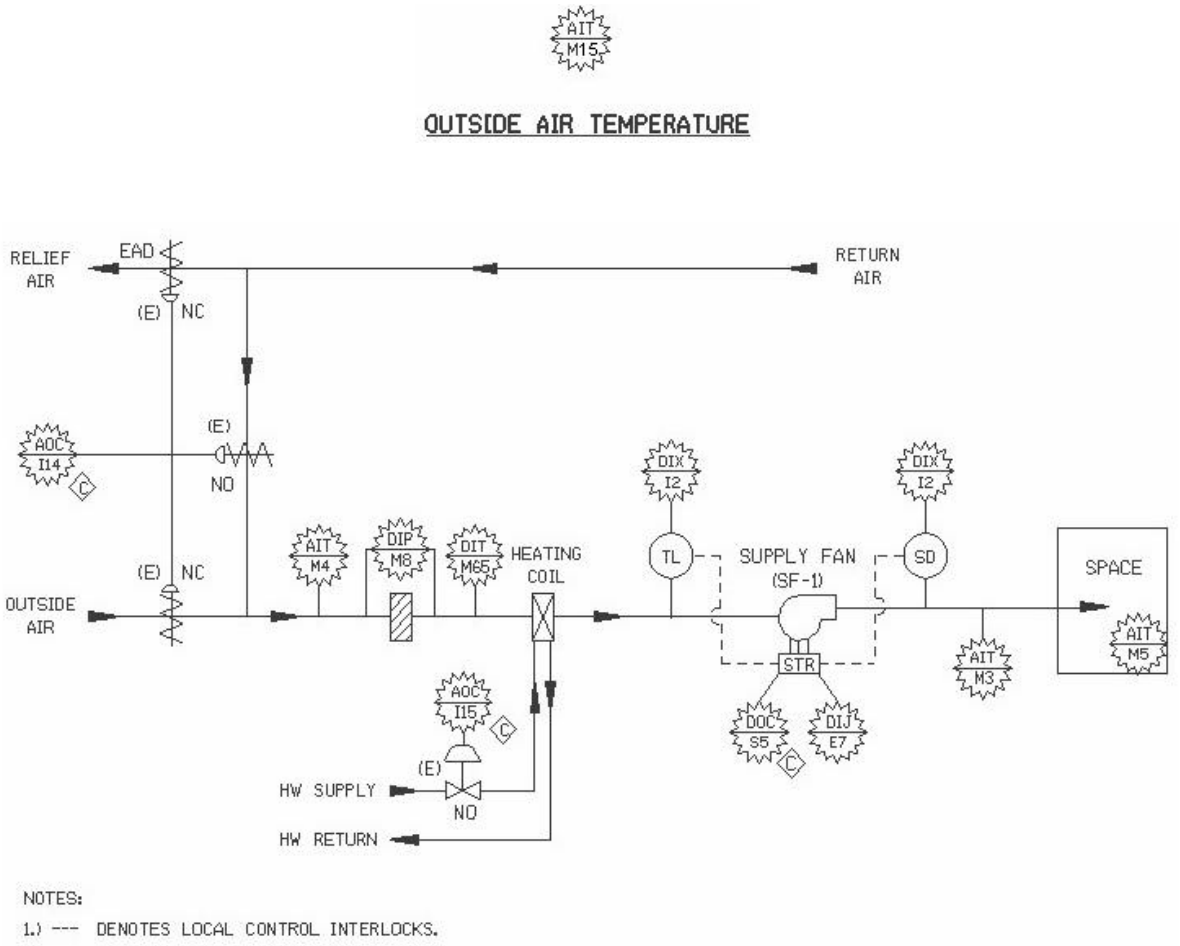



Figure 8-16. Heating and Ventilating System.

Table 8-1. Database Table for Steam/HW Converter and Primary/Secondary Heating System.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 3Φ | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** |
| PRIMARY HW SUPPLY TEMP | SEE RESET SCH. | | SP +/- 5 DEG.F | | SEE RESET SCH. | | SP +/- 5 DEG.F | |
| PRIMARY SYSTEM FLOW | | | XX GPM (LOW) | | | | XX GPM (LOW) | |
| SECONDARY HW SUPPLY TEMP. | | | 160 DEG.F | | | | 160 DEG.F | |
| SECONDARY HW RETURN TEMP | | | 140 DEG.F | | | | 140 DEG.F | |
| STEAM PRESSURE | | | XX PSI | | | | XX PSI | |

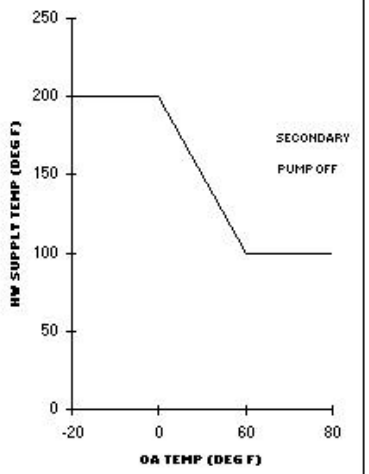
| **SELECTED APPLICATION PROGRAMS** | |
|---|---|
| SCHEDULED START/STOP | X |
| OPTIMUM START/STOP | X |
| ECONOMIZER | |
| VENTILATION/RECIRCULATION | |
| HOT DECK/COLD DECK TEMPERATURE RESET | |
| REHEAT COIL RESET | |
| BOILER MONITORING & CONTROL | |
| CHILLER SELECTION | |
| CHILLED WATER TEMPERATURE RESET | |
| CONDENSER WATER TEMPERATURE RESET | |

REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS

| **DEMAND LIMITING** | |
|---|---|
| SUMMER STEP 1 | |
| SUMMER STEP 2 | |
| SUMMER STEP 3 | |
| WINTER STEP 1 | |
| WINTER STEP 2 | |

**ADDITIONAL SETTINGS**

**PRIMARY SUPPLY TEMP RESET SCHEDULE**




**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

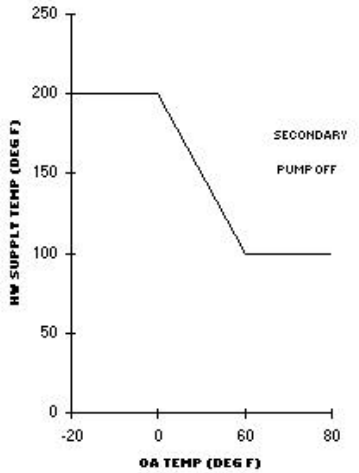
| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| PUMP P-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| PUMP P-2 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-2. Database Table for Hot Water Boiler and Primary/Secondary Heating System.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 30 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** |
| PRIMARY HW SUPPLY TEMP | SEE RESET SCH. | | SP +/- 5DEG.F | | SEE RESET SCH. | | SP +/- 5DEG.F | |
| PRIMARY SYSTEM FLOW | | | XX GPM (LOW) | | | | XX GPM (LOW) | |
| SECONDARY HW SUPPLY TEMP. | | | 160 DEG.F | | | | 160 DEG.F | |
| SECONDARY HW RETURN TEMP. | | | 140 DEG.F | | | | 140 DEG.F | |
| FLUE GAS TEMP | | | XX DEG.F | | | | XX DEG.F | |
| FLUE GAS O2 | | | XX % O2 | | | | XX % O2 | |
| FUEL FLOW | | | XX GPM | | | | XX GPM (LOW) | |
| FUEL TEMP | | | XX DEG.F | | | | XX DEG.F | |

| **SELECTED APPLICATION PROGRAMS** | |
|---|---|
| SCHEDULED START/STOP | X |
| OPTIMUM START/STOP | X |
| ECONOMIZER | |
| VENTILATION/RECIRCULATION | |
| HOT DECK/COLD DECK TEMPERATURE RESET | |
| REHEAT COIL RESET | |
| BOILER MONITORING & CONTROL | |
| CHILLER SELECTION | |
| CHILLED WATER TEMPERATURE RESET | X |
| CONDENSER WATER TEMPERATURE RESET | |
| | |
| | |
| | |
| | |
| REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| **DEMAND LIMITING** | |
| SUMMER STEP 1 | |
| SUMMER STEP 2 | |
| SUMMER STEP 3 | |
| WINTER STEP 1 | |
| WINTER STEP 2 | |
| | |
| **ADDITIONAL SETTINGS** | |

**HW SUPPLY TEMP RESET SCHEDULE**




**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| PUMP P-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| PUMP P-2 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| HW BOILER | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

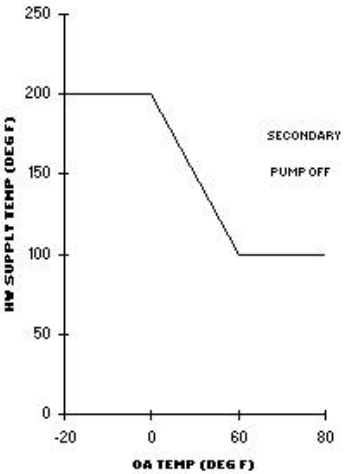
Table 8-3. Database Table for Hot Water Boiler with Constant Volume Circulating Loop and Primary/Secondary Heating System.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 30 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **SUMMER COOLING** | | | | **HEATING** | | | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** |
| PRIMARY HW SUPPLY TEMP | SEE RESET SCH. | | SP +/- 5 DEG.F | | SEE RESET SCH. | | SP +/- 5 DEG.F | |
| PRIMARY SYSTEM FLOW | | | XX GPM (LOW) | | | | XX GPM (LOW) | |
| SECONDARY HW SUPPLY TEMP. | | | 160 DEG.F | | | | 160 DEG.F | |
| SECONDARY HW RETURN TEMP. | | | 140 DEG.F | | | | 140 DEG.F | |
| FLUE GAS TEMP | | | XX DEG.F | | | | XX DEG.F | |
| FLUE GAS O2 | | | XX % O2 | | | | XX % O2 | |
| FUEL FLOW | | | XX GPM | | | | XX GPM (LOW) | |
| FUEL TEMP | | | XX DEG.F | | | | XX DEG.F | |

| **SELECTED APPLICATION PROGRAMS** | |
|---|---|
| SCHEDULED START/STOP | X |
| OPTIMUM START/STOP | X |
| ECONOMIZER | |
| VENTILATION/RECIRCULATION | |
| HOT DECK/COLD DECK TEMPERATURE RESET | |
| REHEAT COIL RESET | |
| BOILER MONITORING & CONTROL | |
| CHILLER SELECTION | |
| CHILLED WATER TEMPERATURE RESET | X |
| CONDENSER WATER TEMPERATURE RESET | |
| REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| **DEMAND LIMITING** | |
| SUMMER STEP 1 | |
| SUMMER STEP 2 | |
| SUMMER STEP 3 | |
| WINTER STEP 1 | |
| WINTER STEP 2 | |

**ADDITIONAL SETTINGS**

**HW SUPPLY TEMP RESET SCHEDULE**




**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| PUMP P-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| PUMP P-2 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| PUMP P-3 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| HW BOILER | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-4. Database Table for High Temperature HW/HWConverter and Primary/Secondary Heating System.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 3Ø | |
|---|---|---|---|---|---|

**SYSTEM OPERATING PARAMETERS**

| PARAMETERS | COOLING | | | | HEATING | | | | SELECTED APPLICATION PROGRAMS |
|---|---|---|---|---|---|---|---|---|---|
| | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | SCHEDULED START/STOP x |
| | | | | | | | | | OPTIMUM START/STOP x |
| | | | | | | | | | ECONOMIZER |
| | | | | | | | | | VENTILATION/RECIRCULATION |
| PRIMARY HW SUPPLY TEMP | SEE RESET SCH. | | SP +/- 5 DEG.F | | SEE RESET SCH. | | SP +/- 5 DEG.F | | HOT DECK/COLD DECK TEMPERATURE RESET |
| | | | | | | | | | REHEAT COIL RESET |
| PRIMARY SYSTEM FLOW | | | XX GPM (LOW) | | | | XX GPM (LOW) | | BOILER MONITORING & CONTROL |
| | | | | | | | | | CHILLER SELECTION |
| SECONDARY HW SUPPLY TEMP. | 160 DEG. F | | SP +/- 5 DEG.F | | 160 DEG. F | | SP +/- 5 DEG.F | | CHILLED WATER TEMPERATURE RESET |
| | | | | | | | | | CONDENSER WATER TEMPERATURE RESET |
| SECONDARY HW RETURN TEMP | | | 140 DEG. F | | | | 140 DEG. F | | |
| | | | | | | | | | |
| HIGH TEMP. HW SUPPLY | | | XX DEG. F | | | | XX DEG. F | | |
| | | | | | | | | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS |
| | | | | | | | | | DEMAND LIMITING |
| | | | | | | | | | SUMMER STEP 1 |
| | | | | | | | | | SUMMER STEP 2 |
| | | | | | | | | | SUMMER STEP 3 |
| | | | | | | | | | WINTER STEP 1 |
| | | | | | | | | | WINTER STEP 2 |
| | | | | | | | | | |

**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| PUMP P-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| PUMP P-2 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

**ADDITIONAL SETTINGS**

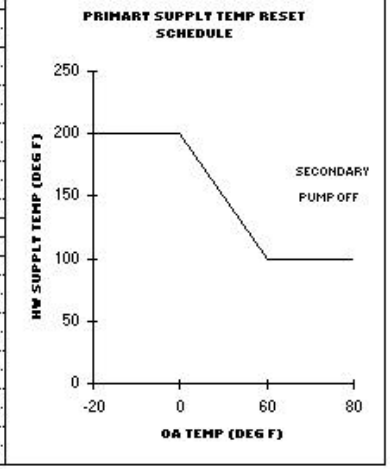


Table 8-5. Database Table for Steam/HW Converter with Dual Temperature Distribution System.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 3Φ | |
|---|---|---|---|---|---|

**SYSTEM OPERATING PARAMETERS**

| PARAMETERS | COOLING | | | | HEATING | | | | SELECTED APPLICATION PROGRAMS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | SCHEDULED START/STOP | X |
| | | | | | | | | | OPTIMUM START/STOP | X |
| | | | | | | | | | ECONOMIZER | |
| | | | | | | | | | VENTILATION/RECIRCULATION | |
| HW SUPPLY TEMP | SEE RESET SCH. | | SP +/- 5 DEG.F | | SEE RESET SCH. | | SP +/- 5 DEG.F | | HOT DECK/COLD DECK TEMPERATURE RESET | |
| | | | | | | | | | REHEAT COIL RESET | |
| SUPPLY TEMP | | | XX DEG.F | | | | XX DEG.F | | BOILER MONITORING & CONTROL | |
| | | | | | | | | | CHILLER SELECTION | |
| RETURN TEMP | | | XX DEG.F | | | | XX DEG.F | | CHILLED WATER TEMPERATURE RESET | |
| | | | | | | | | | CONDENSER WATER TEMPERATURE RESET | |
| SYSTEM FLOW | | | XX GPM (LOW) | | | | XX GPM (LOW) | | | |
| | | | | | | | | | | |
| STEAM PRESSURE | | | 48 DEG.F | | | | XX PSI | | | |
| | | | | | | | | | | |

REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS

| DEMAND LIMITING | |
|---|---|
| SUMMER STEP 1 | |
| SUMMER STEP 2 | |
| SUMMER STEP 3 | |
| WINTER STEP 1 | |
| WINTER STEP 2 | |

**ADDITIONAL SETTINGS**

**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| PUMP P-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

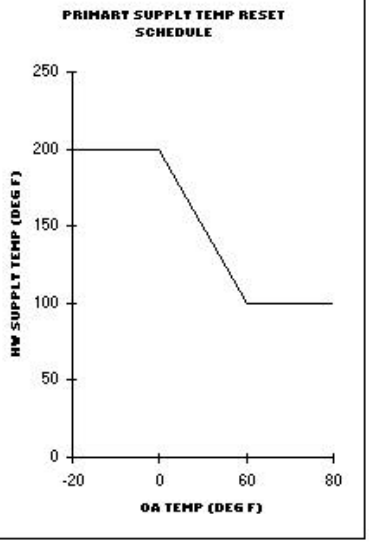


Table 8-6. Database Table for High Temp HW/HW Converter with Dual Temperature Distribution System.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 30 | |
|---|---|---|---|---|---|

**SYSTEM OPERATING PARAMETERS**

| PARAMETERS | COOLING | | | | HEATING | | | | SELECTED APPLICATION PROGRAMS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | SCHEDULED START/STOP | X |
| | | | | | | | | | OPTIMUM START/STOP | X |
| | | | | | | | | | ECONOMIZER | |
| | | | | | | | | | VENTILATION/RECIRCULATION | |
| HW SUPPLY TEMP | SEE RESET SCH. | | SP +/- 5 DEG. F | | SEE RESET SCH. | | SP +/- 5 DEG. F | | HOT DECK/COLD DECK TEMPERATURE RESET | |
| | | | | | | | | | REHEAT COIL RESET | |
| SUPPLY TEMP | | | XX DEG. F | | | | XX DEG. F | | BOILER MONITORING & CONTROL | |
| | | | | | | | | | CHILLER SELECTION | |
| RETURN TEMP | | | XX DEG. F | | | | XX DEG. F | | CHILLED WATER TEMPERATURE RESET | |
| | | | | | | | | | CONDENSER WATER TEMPERATURE RESET | |
| SYSTEM FLOW | | | XX GPM (LOW) | | | | XX GPM (LOW) | | | |
| | | | | | | | | | | |
| HIGH TEMP HW SUPPLY | | | XX DEG. F | | | | XX DEG. F | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | DEMAND LIMITING | |
| | | | | | | | | | SUMMER STEP 1 | |
| | | | | | | | | | SUMMER STEP 2 | |
| | | | | | | | | | SUMMER STEP 3 | |
| | | | | | | | | | WINTER STEP 1 | |
| | | | | | | | | | WINTER STEP 2 | |
| | | | | | | | | | ADDITIONAL SETTINGS | |

**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| PUMP P-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

PRIMARY SUPPLY TEMP RESET SCHEDULE

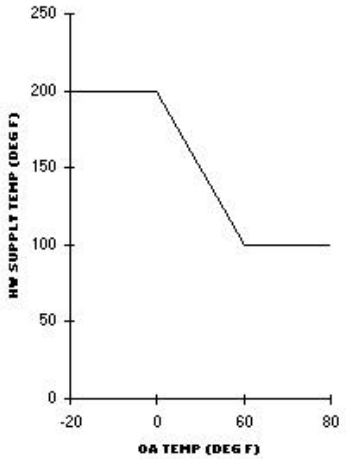


Table 8-7. Database Table for Dual Temperature System with Hot Water Boiler and Air-Cooled Chiller.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 3Φ | |
|---|---|---|---|---|---|

**SYSTEM OPERATING PARAMETERS**

| PARAMETERS | COOLING | | | | HEATING | | | | SELECTED APPLICATION PROGRAMS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | SCHEDULED START/STOP | X |
| | | | | | | | | | OPTIMUM START/STOP | X |
| | | | | | | | | | ECONOMIZER | |
| | | | | | | | | | VENTILATION/RECIRCULATION | |
| HW SUPPLY TEMP | SEE RESET SCH. | | SP +/- 5 DEG.F | | SEE RESET SCH. | | SP +/- 5 DEG.F | | HOT DECK/COLD DECK TEMPERATURE RESET | |
| | | | | | | | | | REHEAT COIL RESET | |
| SUPPLY TEMP | | | XX DEG.F | | | | XX DEG.F | | BOILER MONITORING & CONTROL | |
| | | | | | | | | | CHILLER SELECTION | |
| RETURN TEMP | | | XX DEG.F | | | | XX DEG.F | | CHILLED WATER TEMPERATURE RESET | |
| | | | | | | | | | CONDENSER WATER TEMPERATURE RESET | |
| SYSTEM FLOW | | | XX GPM (LOW) | | | | XX GPM (LOW) | | | |
| | | | | | | | | | | |
| FLUE GAS TEMP | | | XX DEG.F | | | | XX DEG.F | | | |
| | | | | | | | | | | |
| FLUE GAS 02 | | | XX% 02 | | | | XX% 02 | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | | |
| FUEL FLOW | | | XX GPM | | | | XX GPM (LOW) | | | |
| | | | | | | | | | DEMAND LIMITING | |
| FUEL TEMP | | | XX DEG.F | | | | XX DEG.F | | SUMMER STEP 1 | |
| | | | | | | | | | SUMMER STEP 2 | |
| | | | | | | | | | SUMMER STEP 3 | |
| | | | | | | | | | WINTER STEP 1 | |
| | | | | | | | | | WINTER STEP 2 | |
| | | | | | | | | | | |
| | | | | | | | | | ADDITIONAL SETTINGS | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| PUMP P-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| HW BOILER | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| CHILLER | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

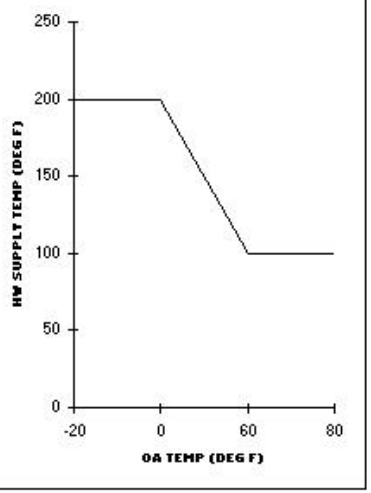


Table 8-8. Database Table for Water-Cooled Chiller.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | | **SELECTED APPLICATION PROGRAMS** | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **SCHEDULED START/STOP** | X |
| | | | | | | | | | **OPTIMUM START/STOP** | X |
| | | | | | | | | | **ECONOMIZER** | |
| | | | | | | | | | **VENTILATION/RECIRCULATION** | |
| CHWS TEMPERATURE | 42 DEG.F | | SP (+/-) 0.5 DEG.F | XX DEG.F | | | | | **HOT DECK/COLD DECK TEMPERATURE RESET** | |
| | | | | | | | | | **REHEAT COIL RESET** | |
| CHWR TEMPERATURE | | | XX 2 DEG.F | | | | | | **BOILER MONITORING & CONTROL** | |
| | | | | | | | | | **CHILLER SELECTION** | |
| CWS TEMPERATURE | 73 DEG.F | | SP (+/-) 2 DEG.F | | | | | | **CHILLED WATER TEMPERATURE RESET** | |
| | | | | | | | | | **CONDENSER WATER TEMPERATURE RESET** | |
| CWR TEMPERATURE | | | XX 2 DEG.F | | | | | | | X |
| | | | | | | | | | | X |
| CHWS FLOW | | | XX 5 GPM | | | | | | | |
| | | | | | | | | | | |
| CWS FLOW | | | XX 5 GPM | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | | |
| CWS pH LEVEL | | | 6 pH/8 pH | | | | | | **DEMAND LIMITING** | |
| | | | | | | | | | SUMMER STEP 1 | |
| | | | | | | | | | **SUMMER STEP 2** | |
| | | | | | | | | | **SUMMER STEP 3** | |
| | | | | | | | | | **WINTER STEP 1** | |
| | | | | | | | | | **WINTER STEP 2** | |
| | | | | | | | | | | |
| | | | | | | | | | **ADDITIONAL SETTINGS** | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| **OCCUPANCY SCHEDULE** | | | | |
|---|---|---|---|---|
| **DAY OF WEEK/ HOLIDAY** | **OCCUPIED PERIOD 1** | **OCCUPIED PERIOD 2** | **OCCUPIED PERIOD 3** | **OCCUPIED PERIOD 4** |
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

| **EQUIPMENT SCHEDULE** | | | | |
|---|---|---|---|---|
| **EQUIPMENT NAME** | **CAPACITY** | **MOTOR HP** | **MANUFACTURER** | **MODEL/SERIES** |
| CHILLER | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| COOLING TOWER | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| CHW PUMP | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| CW PUMP | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-9. Database Table for Multi-Zone Air Handling System with Hot Water and Chilled Water Coils.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAT ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | | **SELECTED APPLICATION PROGRAMS** | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | | |
| | | | | | | | | | **SCHEDULED START/STOP** | X |
| | | | | | | | | | **OPTIMUM START/STOP** | X |
| MIXED AIR TEMP | PER SEQUENCE | | SP (+/-) 2 DEG.F | | PER SEQUENCE | | SP (+/-) 2 DEG.F | | **ECONOMIZER** | X |
| | | | | | | | | | **VENTILATION/RECIRCULATION** | X |
| HOT DECK TEMP | PER RESET SCH. | | SP (+/-) 2 DEG.F | | PER RESET SCH. | | SP (+/-) 2 DEG.F | | **HOT DECK/COLD DECK TEMPERATURE RESET** | X |
| | | | | | | | | | **REHEAT COIL RESET** | |
| COLD DECK TEMP | PER RESET SCH. | | SP (+/-) 2 DEG.F | | PER RESET SCH. | | SP (+/-) 2 DEG.F | | **BOILER MONITORING & CONTROL** | |
| | | | | | | | | | **CHILLER SELECTION** | |
| ZONE SPACE TEMP | 75 DEG.F | 82 DEG.F | SP (+/-) 2 DEG.F | 80 DEG.F | 68 DEG.F | 58 DEG.F | SP (+/-) 2 DEG.F | 62 DEG.F | **CHILLED WATER TEMPERATURE RESET** | |
| | | | | | | | | | **CONDENSER WATER TEMPERATURE RESET** | |
| FILTER | | | 1.25" WC | | | | 1.25" WC | | | |
| LOW TEMP DEVICE | | | 35 DEG.F | | | | 35 DEG.F | | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | **DEMAND LIMITING** | |
| | | | | | | | | | **SUMMER STEP 1** | |
| | | | | | | | | | **SUMMER STEP 2** | |
| | | | | | | | | | **SUMMER STEP 3** | |
| | | | | | | | | | **WINTER STEP 1** | X |
| | | | | | | | | | **WINTER STEP 2** | |
| | | | | | | | | | **ADDITIONAL SETTINGS** | |

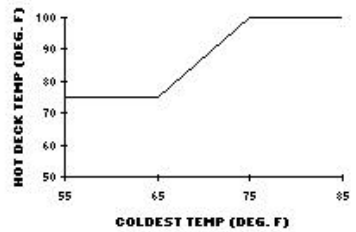
**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| SUPPLY FAN SF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| RETURN FAN RF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

HOT DECK TEMP RESET SCHEDULE




COLD DECK TEMP RESET SCHEDULE

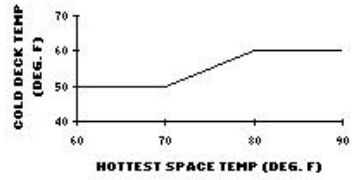


Table 8-10. Database Table for Dual Duct Air Handling System with Hot Water and Chilled Water Coils.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAT ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | | **SELECTED APPLICATION PROGRAMS** | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | | |
| | | | | | | | | | SCHEDULED START/STOP | X |
| | | | | | | | | | OPTIMUM START/STOP | X |
| | | | | | | | | | ECONOMIZER | X |
| | | | | | | | | | VENTILATION/RECIRCULATION | X |
| MIXED AIR TEMP | PER SEQUENCE | | SP (+/-) 2 DEG.F | | PER SEQUENCE | | SP (+/-) 2 DEG.F | | HOT DECK/COLD DECK TEMPERATURE RESET | X |
| | | | | | | | | | REHEAT COIL RESET | |
| HOT DECK TEMP | PER RESET SCH. | | SP (+/-) 2 DEG.F | | PER RESET SCH. | | SP (+/-) 2 DEG.F | | BOILER MONITORING & CONTROL | |
| | | | | | | | | | CHILLER SELECTION | |
| COLD DECK TEMP | PER RESET SCH. | | SP (+/-) 2 DEG.F | | PER RESET SCH. | | SP (+/-) 2 DEG.F | | CHILLED WATER TEMPERATURE RESET | |
| | | | | | | | | | CONDENSER WATER TEMPERATURE RESET | |
| ZONE SPACE TEMP | 75 DEG.F | 82 DEG.F | SP (+/-) 2 DEG.F | 80 DEG.F | 68 DEG.F | 58 DEG.F | SP (+/-) 2 DEG.F | 63 DEG.F | | |
| | | | | | | | | | | |
| FILTER | | | 1.25" WC | | | | 1.25" WC | | | |
| | | | | | | | | | | |
| LOW TEMP DEVICE | | | 35 DEG.F | | | | 35 DEG.F | | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | **DEMAND LIMITING** | |
| | | | | | | | | | SUMMER STEP 1 | |
| | | | | | | | | | SUMMER STEP 2 | |
| | | | | | | | | | SUMMER STEP 3 | |
| | | | | | | | | | WINTER STEP 1 | X |
| | | | | | | | | | WINTER STEP 2 | |
| | | | | | | | | | **ADDITIONAL SETTINGS** | |

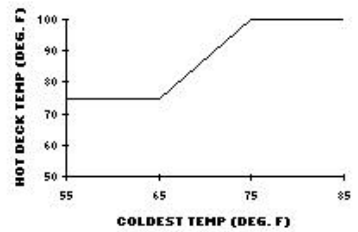
**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| SUPPLY FAN SF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| RETURN FAN RF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

HOT DECK TEMP RESET SCHEDULE




COLD DECK TEMP RESET SCHEDULE

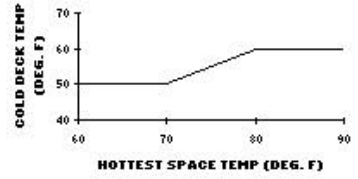


Table 8-11. Database Table for Bypass Multi-Zone Air Handling System with Hot Water and Chilled Water Coils

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** |
| HOT DECK TEMP | PER RESET SCH. | | SP (+/-) 2 DEG.F | | PER RESET SCH. | | SP (+/-) 2 DEG.F | |
| COLD DECK TEMP | PER RESET SCH. | | SP (+/-) 2 DEG.F | | PER RESET SCH. | | SP (+/-) 2 DEG.F | |
| ZONE SPACE TEMP | 75 DEG.F | 82 DEG.F | SP (+/-) 2 DEG.F | 80 DEG.F | 68 DEG.F | 58 DEG.F | SP (+/-) 2 DEG.F | 63 DEG.F |
| FILTER | | | 1.25" WC | | | | 1.25" WC | |
| LOW TEMP DEVICE | | | 35 DEG.F | | | | 35 DEG.F | |

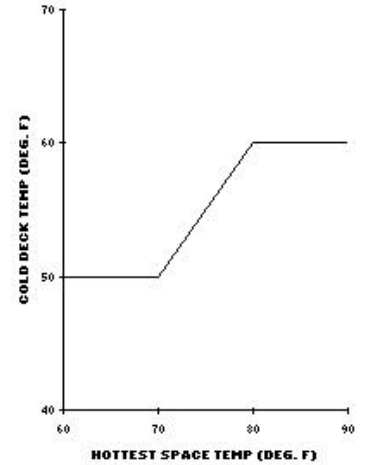
| **SELECTED APPLICATION PROGRAMS** | |
|---|---|
| SCHEDULED START/STOP | X |
| OPTIMUM START/STOP | X |
| ECONOMIZER | X |
| VENTILATION/RECIRCULATION | X |
| HOT DECK/COLD DECK TEMPERATURE RESET | X |
| REHEAT COIL RESET | |
| BOILER MONITORING & CONTROL | |
| CHILLER SELECTION | |
| CHILLED WATER TEMPERATURE RESET | |
| CONDENSER WATER TEMPERATURE RESET | |

REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS

| **DEMAND LIMITING** | |
|---|---|
| SUMMER STEP 1 | |
| SUMMER STEP 2 | |
| SUMMER STEP 3 | |
| WINTER STEP 1 | X |
| WINTER STEP 2 | |

**ADDITIONAL SETTINGS**

**COLD DECK TEMP RESET SCHEDULE**




**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| SUPPLY FAN SF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| RETURN FAN RF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-12. Database Table for VAV Air Handling System with Hot Water and Chilled Water Coils

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | | **SELECTED APPLICATION PROGRAMS** | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **SCHEDULED START/STOP** | X |
| | | | | | | | | | **OPTIMUM START/STOP** | X |
| | | | | | | | | | **ECONOMIZER** | X |
| | | | | | | | | | **VENTILATION/RECIRCULATION** | X |
| SUPPLY AIR TEMP | 55 DEG. F | | SP (+/-) 2 DEG. F | | 55 DEG. F | | SP (+/-) 2 DEG. F | | **HOT DECK/COLD DECK TEMPERATURE RESET** | |
| | | | | | | | | | **REHEAT COIL RESET** | X |
| MIXED AIR TEMP | PER SEQUENCE | | SP (+/-) 2 DEG. F | | PER SEQUENCE | | SP (+/-) 2 DEG. F | | **BOILER MONITORING & CONTROL** | |
| | | | | | | | | | **CHILLER SELECTION** | |
| SPACE TEMP | 75 DEG. F | 82 DEG. F | SP (+/-) 2 DEG. F | 80 DEG. F | 68 DEG. F | 58 DEG. F | SP (+/-) 2 DEG. F | 62 DEG. F | **CHILLED WATER TEMPERATURE RESET** | |
| | | | | | | | | | **CONDENSER WATER TEMPERATURE RESET** | |
| FILTER | | | 1.25" WC | | | | 1.25" WC | | | |
| | | | | | | | | | | |
| SUPPLY AIR STATIC PRESS. | SYSTEM SPECIFIC | | SP (+/-) 0.5" W.C. | | SYSTEM SPECIFIC | | SP (+/-) 0.5" W.C. | | | |
| | | | | | | | | | | |
| LOW TEMP DEVICE | | | 35 DEG. F | | | | 35 DEG. F | | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | **DEMAND LIMITING** | |
| | | | | | | | | | SUMMER STEP 1 | |
| | | | | | | | | | **SUMMER STEP 2** | |
| | | | | | | | | | **SUMMER STEP 3** | |
| | | | | | | | | | **WINTER STEP 1** | X |
| | | | | | | | | | **WINTER STEP 2** | |
| | | | | | | | | | | |
| | | | | | | | | | **ADDITIONAL SETTINGS** | |

**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| SUPPLY FAN SF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-13. Database Table for VAV Air Handling System with Return Fan and Hot Water/Chilled Water Coils

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **HEATING** | | | | **COOLING** | | | | **SELECTED APPLICATION PROGRAMS** |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **SCHEDULED START/STOP** x |
| | | | | | | | | | **OPTIMUM START/STOP** x |
| | | | | | | | | | **ECONOMIZER** x |
| | | | | | | | | | **VENTILATION/RECIRCULATION** x |
| SUPPLY AIR TEMP | 55 DEG. F | | SP (+/-) 2 DEG. F | | 55 DEG. F | | SP (+/-) 2 DEG. F | | **HOT DECK/COLD DECK TEMPERATURE RESET** |
| | | | | | | | | | **REHEAT COIL RESET** x |
| MIXED AIR TEMP | PER SEQUENCE | | SP (+/-) 2 DEG. F | | PER SEQUENCE | | SP (+/-) 2 DEG. F | | **BOILER MONITORING & CONTROL** |
| | | | | | | | | | **CHILLER SELECTION** |
| SPACE TEMP | 75 DEG. F | 82 DEG. F | SP (+/-) 2 DEG. F | 80 DEG. F | 68 DEG. F | 58 DEG. F | SP (+/-) 2 DEG. F | 63 DEG. F | **CHILLED WATER TEMPERATURE RESET** |
| | | | | | | | | | **CONDENSER WATER TEMPERATURE RESET** |
| FILTER | | | 1.25" WC | | | | 1.25" WC | | |
| | | | | | | | | | |
| SUPPLY AIR STATIC PRESS. | SYSTEM SPECIFIC | | SP (+/-) 0.5" W.C. | | SYSTEM SPECIFIC | | SP (+/-) 0.5" W.C. | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS |
| LOW TEMP DEVICE | | | 35 DEG. F | | | | 35 DEG. F | | |
| | | | | | | | | | **DEMAND LIMITING** |
| RETURN FAN FLOW | SUPPLY CFM | | SP (+/-) XX CFM | | SUPPLY CFM | | SP (+/-) XX CFM | | **SUMMER STEP 1** x |
| | (-) MIN. OA CFM | | | | (-) MIN. OA CFM | | | | **SUMMER STEP 2** |
| | | | | | | | | | **SUMMER STEP 3** |
| | | | | | | | | | **WINTER STEP 1** x |
| | | | | | | | | | **WINTER STEP 2** |
| | | | | | | | | | |
| | | | | | | | | | **ADDITIONAL SETTINGS** |

**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| SUPPLY FAN SF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
| RETURN FAN RF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-14. Database Table for Single Zone Air Handling System
With Hot Water/Chilled Water Coils andHumidification.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| SYSTEM OPERATING PARAMETERS | | | | | | | | |
| PARAMETERS | COOLING | | | | HEATING | | | | SELECTED APPLICATION PROGRAMS |
| | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | SCHEDULED START/STOP x |
| | | | | | | | | | OPTIMUM START/STOP x |
| MIXED AIR TEMP | PER SEQUENCE | | SP (+/-) 2 DEG.F | | PER SEQUENCE | | SP (+/-) 2 DEG.F | | ECONOMIZER x |
| | | | | | | | | | VENTILATION/RECIRCULATION x |
| SPACE TEMP | 75 DEG.F | 82 DEG.F | SP (+/-) 2 DEG.F | 80 DEG.F | 68 DEG.F | 58 DEG.F | SP (+/-) 2 DEG.F | 63 DEG.F | HOT DECK/COLD DECK TEMPERATURE RESET |
| | | | | | | | | | REHEAT COIL RESET |
| FILTER | | | 1.25" WC | | | | 1.25" | | BOILER MONITORING & CONTROL |
| | | | | | | | | | CHILLER SELECTION |
| LOW TEMP DEVICE | | | 35 DEG.F | | | | 35 DEG.F | | CHILLED WATER TEMPERATURE RESET |
| | | | | | | | | | CONDENSER WATER TEMPERATURE RESET |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS |
| | | | | | | | | | DEMAND LIMITING |
| | | | | | | | | | SUMMER STEP 1 x |
| | | | | | | | | | SUMMER STEP 2 |
| | | | | | | | | | SUMMER STEP 3 |
| | | | | | | | | | WINTER STEP 1 x |
| | | | | | | | | | WINTER STEP 2 |
| | | | | | | | | | ADDITIONAL SETTINGS |

| OCCUPANCY SCHEDULE | | | | |
|---|---|---|---|---|
| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

| EQUIPMENT SCHEDULE | | | | |
|---|---|---|---|---|
| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
| SF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-15. Database Table for Single Zone Air Handling System with Hot Water and DX Refrigeration Coils.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| SYSTEM OPERATING PARAMETERS | | | | | | | | |
| PARAMETERS | COOLING | | | | HEATING | | | | SELECTED APPLICATION PROGRAMS | |
| | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | DEFAULT OCCUPIED SETPOINT | DEFAULT UNOCCUPIED SETPOINT | ALARM LIMIT SETTINGS | DEMAND LIMIT SETPOINT | SCHEDULED START/STOP | X |
| | | | | | | | | | OPTIMUM START/STOP | X |
| | | | | | | | | | ECONOMIZER | X |
| | | | | | | | | | VENTILATION/RECIRCULATION | X |
| MIXED AIR TEMP | PER SEQUENCE | | SP (+/-)2 DEG.F | | PER SEQUENCE | | SP (+/-)2 DEG.F | | HOT DECK/COLD DECK TEMPERATURE RESET | |
| | | | | | | | | | REHEAT COIL RESET | |
| SPACE TEMP | 75 DEG.F | 82 DEG.F | SP (+/-)2 DEG.F | 80 DEG.F | 68 DEG.F | 58 DEG.F | SP (+/-)2 DEG.F | 63 DEG.F | BOILER MONITORING & CONTROL | |
| | | | | | | | | | CHILLER SELECTION | |
| FILTER | | | 1.25" WC | | | | 1.25" | | CHILLED WATER TEMPERATURE RESET | |
| | | | | | | | | | CONDENSER WATER TEMPERATURE RESET | |
| LOW TEMP DEVICE | | | 35 DEG.F | | | | 35 DEG.F | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | DEMAND LIMITING | |
| | | | | | | | | | SUMMER STEP 1 | X |
| | | | | | | | | | SUMMER STEP 2 | |
| | | | | | | | | | SUMMER STEP 3 | |
| | | | | | | | | | WINTER STEP 1 | X |
| | | | | | | | | | WINTER STEP 2 | |
| | | | | | | | | | | |
| | | | | | | | | | ADDITIONAL SETTINGS | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| OCCUPANCY SCHEDULE | | | | |
|---|---|---|---|---|
| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

| EQUIPMENT SCHEDULE | | | | |
|---|---|---|---|---|
| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
| SF-1 | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |

Table 8-16. Database Table for Heating and Ventilating System.

| INSTALLATION: SITE NAME | AREA: | BLDG: | LOCATION: | ALARM DELAY ON STARTUP: 15 | | | | |
|---|---|---|---|---|---|---|---|---|
| **SYSTEM OPERATING PARAMETERS** | | | | | | | | |
| **PARAMETERS** | **COOLING** | | | | **HEATING** | | | | **SELECTED APPLICATION PROGRAMS** | |
| | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **DEFAULT OCCUPIED SETPOINT** | **DEFAULT UNOCCUPIED SETPOINT** | **ALARM LIMIT SETTINGS** | **DEMAND LIMIT SETPOINT** | **SCHEDULED START/STOP** | x |
| | | | | | | | | | **OPTIMUM START/STOP** | x |
| | | | | | | | | | **ECONOMIZER** | |
| | | | | | | | | | **VENTILATION/RECIRCULATION** | x |
| MIXED AIR TEMP | PER SEQUENCE | | SP (+/-) XX DEG.F | | PER SEQUENCE | | SP (+/-) XX DEG.F | | **HOT DECK/COLD DECK TEMPERATURE RESET** | |
| | | | | | | | | | **REHEAT COIL RESET** | |
| SPACE TEMP | XX DEG.F | XX DEG.F | SP (+/-) XX DEG.F | | XX DEG.F | XX DEG.F | SP (+/-) XX DEG.F | | **BOILER MONITORING & CONTROL** | |
| | | | | | | | | | **CHILLER SELECTION** | |
| SUPPLY TEMP | | | XX DEG.F (LO) | | | | XX DEG.F (LO) | | **CHILLED WATER TEMPERATURE RESET** | |
| | | | | | | | | | **CONDENSER WATER TEMPERATURE RESET** | |
| FILTER | | | X.XX" WC | | | | X.XX" WC | | | |
| | | | | | | | | | | |
| LOW TEMP DEVICE | | | XX DEG.F | | | | XX DEG.F | | | |
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| | | | | | | | | | REFER TO SEQUENCE OF OPERATIONS FOR ADDITIONAL SOFTWARE, SETTINGS AND OPERATIONAL REQUIREMENTS | |
| | | | | | | | | | **DEMAND LIMITING** | |
| | | | | | | | | | **SUMMER STEP 1** | x |
| | | | | | | | | | **SUMMER STEP 2** | |
| | | | | | | | | | **SUMMER STEP 3** | |
| | | | | | | | | | **WINTER STEP 1** | x |
| | | | | | | | | | **WINTER STEP 2** | |
| | | | | | | | | | | |
| | | | | | | | | | **ADDITIONAL SETTINGS** | |
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**OCCUPANCY SCHEDULE**

| DAY OF WEEK/ HOLIDAY | OCCUPIED PERIOD 1 | OCCUPIED PERIOD 2 | OCCUPIED PERIOD 3 | OCCUPIED PERIOD 4 |
|---|---|---|---|---|
| SUNDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| MONDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| TUESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| WEDNESDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| THURSDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| FRIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| SATURDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |
| HOLIDAY | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC | SITE SPECIFIC |

**EQUIPMENT SCHEDULE**

| EQUIPMENT NAME | CAPACITY | MOTOR HP | MANUFACTURER | MODEL/SERIES |
|---|---|---|---|---|
| SUPPLY FAN (SF-1) | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC | SYSTEM SPECIFIC |
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